



CONNECT GREATER MADISON 2050

REGIONAL TRANSPORTATION PLAN



GREATER MADISON
mpo

May 2022

Connect Greater Madison 2050

Regional Transportation Plan for the Madison Metropolitan Area

Greater Madison Metropolitan Planning Organization

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The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation or WisDOT.

MPO 2022 Resolution No. 4

Approving the *Connect Greater Madison* Regional Transportation Plan 2050 for the Madison Metropolitan Area

WHEREAS, the Greater Madison MPO is the designated Metropolitan Planning Organization for the Madison, Wisconsin Metropolitan Area with responsibilities to perform regional transportation planning and programming, in cooperation with the Wisconsin Department of Transportation and Metro Transit, the major transit operator; and

WHEREAS, one of the primary responsibilities of the MPO is to prepare and approve a long-range regional transportation plan in accordance with the Infrastructure Investment & Jobs Act (IIJA), also known as the Bipartisan Infrastructure Bill (23 U.S.C. 104, 134) and implementing U.S. Department of Transportation (DOT) regulations (23 C.F.R. 450); and

WHEREAS, the regional transportation plan is a multi-modal transportation systems plan that defines the goals for the region and specifies policies, projects, and recommendations to help achieve these goals; and

WHEREAS, the Greater Madison MPO has updated the current adopted plan, *Regional Transportation (RTP) 2050 for the Madison Metropolitan Area*, using new population, household, and employment forecasts based on the growth scenario developed for the Capital Area Regional Planning Commission's *Regional Development Framework*, and revised the year 2050 travel demand forecasts accordingly;

WHEREAS, the updated plan, *Connect Greater Madison Regional Transportation 2050* for the Madison Metropolitan Area, ties the plan goals to performance measures that were used to evaluate the performance of the plan and which will also be used to track the region's progress in meeting plan goals over time; and

WHEREAS, in preparing the *Connect Greater Madison* plan the Greater Madison MPO followed federal guidance as set out in the Metropolitan Transportation Planning rule, 23 C.F.R. 450, including consideration of the federal planning factors, identification of performance measures, preparation of financial, environmental, environmental justice and system performance analyses of the plan, and preparation of an updated Congestion Management Process; and

WHEREAS, in preparing the *Connect Greater Madison* plan the Greater Madison MPO utilized an extensive public involvement process, including a plan website, survey, focus groups, three series of virtual public information meetings, other presentations, and a public hearing, and comments have been considered throughout the process and changes made to draft plan materials and the draft plan as determined to be appropriate; and

WHEREAS, the regional transportation plan is intended to guide implementing agencies in development of projects and implementation of other recommendations and supporting actions to guide improvements for all modes of transportation; and

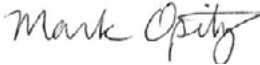
WHEREAS, since the adoption of the previous RTP 2050 the MPO has coordinated with WisDOT and Metro Transit to identify federal performance measure targets as these measures have been finalized and worked to implement other performance-based planning and programming requirements, and the MPO has annually prepared a performance measures report indicating progress achieved in reaching the federal measure targets and improving performance on other regional measures selected by MPO to gauge success in achieving plan goals:

NOW THEREFORE BE IT RESOLVED, the Greater Madison MPO adopts the *Connect Greater Madison* Regional Transportation Plan 2050 for the Madison Metropolitan Area, which incorporates the changes to the Draft Plan, dated April 2022, listed in the Addition/Change sheet dated May 5, 2022, as the official transportation plan for the region to serve as a guide for transportation planning, system development, and investments and as the basis for the Greater Madison MPO's review of proposed projects in the Transportation Improvement Program; and that this plan supersedes the previous *Regional Transportation Plan 2050*, dated April 2017.

BE IT FURTHER RESOLVED that the Greater Madison MPO certifies that the federal metropolitan transportation planning process is addressing major issues facing the metropolitan area and is being conducted in accordance with all applicable federal requirements, including:

1. 23 U.S.C. 134 and 49 U.S.C. 5303, and this subpart;
2. Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d-1) and 49 C.F.R. Part 21;
3. 49 U.S.C. 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity;
4. Sections 1101(b) of the FAST Act (Pub. L. 114-357) and 49 C.F.R. Part 26 regarding the involvement of disadvantaged business enterprises in U.S. DOT funded projects;
5. 23 C.F.R. Part 230, regarding the implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;
6. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and 49 C.F.R. Parts 27, 37, and 38;
7. The Older Americans Act, as amended (42 U.S.C. 6101), prohibiting discrimination on the basis of age in programs or activities receiving Federal financial assistance;
8. 23 U.S.C. 324 regarding the prohibition of discrimination based on gender; and
9. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 C.F.R. 27 regarding discrimination against individuals with disabilities.

May 11, 2022
Date Adopted



Mark Opitz, Chair
Greater Madison MPO

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List of Acronyms

AADT	Annual Average Daily Traffic	EJ	Environmental Justice	LEED	Leadership in Energy and Environmental Design
ACS	American Community Survey	EPA	Environmental Protection Agency	LEHD	Longitudinal Employer-Household Dynamics (Survey)
ADA	Americans with Disabilities Act (1990)	ERH	Emergency Ride Home	LOS	Level of Service
ADAD	Advanced Driver Assistance Systems	FAST Act	Fixing America's Surface Transportation Act	LRIP	Local Roads Improvement Program
ADT	Average Daily Traffic	FHWA	Federal Highway Administration	LTS	(Bicycle) Level of Traffic Stress
AWT	Average Weekday Traffic	FRA	Federal Railroad Administration	MAP-2	Moving Ahead for Progress in the 21st Century Act
BIC	Beltline-Interstate Interchange	FTA	Federal Transit Administration	MATC	Madison Area Technical College/ Madison College
BIL	Bipartisan Infrastructure Law (aka IIJA)	FUDA	Future Urban Development Area	MIPRC	Midwest Interstate Passenger Rail Commission
BLS	Bureau of Labor Statistics	FY	Fiscal Year	MPO	Metropolitan Planning Organization
BR	Bridge Replacement Rehabilitation Program	GIS	Geographic Information System	MUTCD	Manual on Uniform Traffic Control Devices
BRT	Bus Rapid Transit	GPS	Global Positioning System	MWRRP	Midwest Regional Rail Plan
CARPC	Capital Area Regional Planning Commission	GTA	General Transportation Aids	NBI	National Bridge Inventory
CBD	Central Business District	HH	Household	NEPA	National Environmental Policy Act
CMP	Congestion Management Process	HSIP	Highway Safety Improvement Program	NHFN	National Highway Freight Network
CO2	Carbon Dioxide	HSMO	Highway System Management and Operations Program	NHFP	National Highway Freight Program
CP	Canadian Pacific Railroad	HUD	U.S. Department of Housing and Urban Development	NHPP	National Highway Performance Program
CRFC	Critical Rural Freight Corridor	IIJA	Infrastructure Investment & Jobs Act (aka BIL)	NHS	National Highway System Program
CSS	Context Sensitive Solutions	ISTEA	Intermodal Surface Transportation Efficiency Act of 1991	NHTS	National Household Transportation Survey
CTH	County Trunk Highway	ITS	Intelligent Transportation Systems	NHTSA	National Highway Traffic Safety Administration
DCRA	Dane County Regional Airport	LED	Light Emitting Diode		
EA	Environmental Assessment				
EIS	Environmental Impact Statement				

NMFN	National Multimodal Freight Network	SOV	Single Occupant Vehicle	UAV	Unmanned Aerial Vehicle
NTD	National Transit Database	SRTS	Safe Routes to School	UP	Union Pacific Railroad
OCR	Office of the Commissioner of Railroads	STBG	Surface Transportation Program Block Grant	UPWP	Unified Planning Work Program
O/D	Origin - Destination	STH	State Trunk Highway	USA	Urban Service Area
O & M	Roadway Operations and Maintenance Costs	STOC	State Traffic Operations Center	USDOT	United States Department of Transportation
QCEW	Quarterly Census of Employment and Wages	STP	Surface Transportation Program	USH	U.S. Highway
PASER	Pavement Surface Evaluation and Rating	TAP	Transportation Alternatives Program	UW	University of Wisconsin
PCI	Pavement Condition Index	TAZ	Traffic Analysis Zone	V/C	Volume-to-Capacity Ratio
PDI	Pavement Distress Index	TCC	Technical Coordinating Committee	VMT	Vehicle Miles Traveled
PEL	Planning and Environmental Linkages	TDM	Travel Demand Management	V2I	Vehicle to Infrastructure Communication
PHFS	Primary Highway Freight System	TDP	Transit Development Plan	V2V	Vehicle to Vehicle Communication
PIM	Public Involvement Meeting	TID	Tax Increment District	WisDNR	Wisconsin Department of Natural Resources
PNR	Park-and-Ride	TIGER	Transportation Investment Generating Economic Recovery (Grant Program)	WisDOA	Wisconsin Department of Administration
RDF	Regional Development Framework (CARPC)	TIP	Transportation Improvement Program	WisDOT	Wisconsin Department of Transportation
ROW	Right of Way	TMA	Transportation Management Area	WISLR	Wisconsin Information System for Local Roads
RSVP	Retired Senior Volunteer Driver Escort Program	TOD	Transit-Oriented Development	WRRTC	Wisconsin River Rail Transit Commission
RTA	Regional Transit or Transportation Authority	TOIP	Transportation Operations Infrastructure Plan	WSOR	Wisconsin & Southern Railroad Company
RTP	Regional Transportation Plan	TOPS	(UW-Madison) Traffic Operations and Safety (Laboratory)		
SHR	State Highway Rehabilitation	TPC	Transportation Projects Commission		
SHSP	Strategic Highway Safety Plan	TSM	Transportation Systems Management		
SLATS	Stateline Area Transportation Study	UAFP	Urbanized Area Formula Program		
		UAS	Unmanned Aircraft System		



Connect Greater Madison 2050

Executive Summary

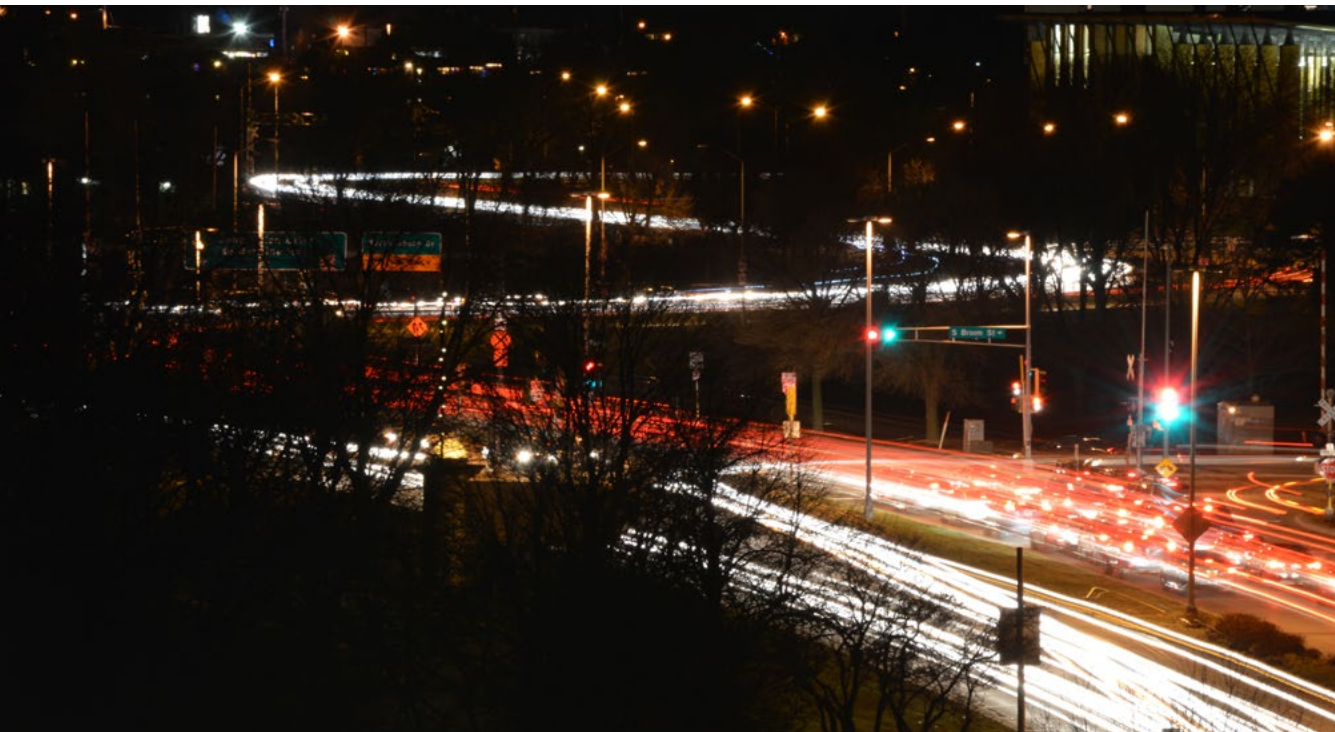
The Connect Greater Madison 2050 Regional Transportation Plan

The Madison region's transportation system provides critical connections to commerce, employment, health care, education and recreation, and supports the quick and efficient movement of goods and services. A successfully integrated multi-modal transportation system provides multiple options for commuting, shopping, leisure, and regional travel. Transportation affects the affordability of neighborhoods and

communities, as well as the viability of community and economic development. The transportation network also directly influences quality of life in the region. Safe and efficient regional transportation facilities ensure convenient business and leisure travel, while an integrated, well-connected network makes traveling by all modes convenient and enjoyable. Streets can foster community by acting as community gathering and meeting spaces, and high quality transit and bicycling options are important for employers wanting to attract young, educated, skilled workers.

The *Connect Greater Madison 2050* Regional Transportation Plan (RTP) sets the

framework for the future of transportation in the Madison region, identifying how the region intends to invest in the transportation system to accommodate current travel demands and future growth, while setting priorities that balance limited funds. The plan includes strategies to begin addressing important trends such as rapidly evolving transportation technology and the rise of teleworking, as well as strategies to take action on critical issues, including equity and climate change. It articulates how the region intends to build, manage, and operate its multi-modal transportation system to meet important regional economic, transportation,



Greater Madison MPO Mission and Vision

MISSION

Lead the collaborative planning and funding of a sustainable, equitable transportation system for the greater Madison region.

VISION

A sustainable, equitable regional transportation system that connects people, places, and opportunities to achieve an exceptional quality of life for all.

development, and sustainability goals. Finally, the plan ties goals to performance measures and sets targets to track progress.

The RTP is a federally required long-range (20+ years) transportation plan that guides federally funded transportation investments. It must be updated every five years in order for the Madison metropolitan area to be eligible to receive federal funding for transportation projects. The *Connect Greater Madison 2050* plan update builds upon recent and ongoing MPO, WisDOT, and local government projects, plans, and studies, including an MPO traffic safety study, WisDOT's Beltline flex lane and U.S. Highway 51 Highway projects, and Metro's Bus Rapid Transit project and Transit Network Redesign study. Federal rules require the plan to be financially constrained.

The plan complements and supports the Capital Area Regional Planning Commission's (CARPC) Regional Development Framework (RDF), including the future growth scenario built using the RDF goals and strategies and local plans. Together with the RDF, Connect Greater Madison 2050 establishes a regional vision for the future, and roadmap to achieving regional transportation and land use goals through strategic, coordinated investments.

THE ROLE OF THE GREATER MADISON MPO

The Greater Madison MPO is the federally designated metropolitan planning organization (MPO) responsible for overseeing the transportation planning

The Connect Greater Madison 2050 Regional Transportation Plan Goals



GOAL 1: LIVABLE COMMUNITIES

Create connected livable places linked to jobs, services, education, retail, and recreation through a multimodal transportation system that supports compact development patterns, increasing the viability of walking, bicycling, and public transit.



GOAL 2: SAFETY

Ensure that the transportation system enables all people to get to where they need to go safely with an emphasis on enhanced protection for vulnerable roadway users through use of a safe systems approach, thereby helping to achieve the long-term goal of eliminating fatal and serious traffic injuries.



GOAL 3: PROSPERITY

Build and maintain a transportation system that provides people with affordable access to jobs, enables the efficient movement of goods and services within the region and beyond, and supports and attracts diverse residents and businesses, creating a shared prosperity that provides economic opportunities for all.



GOAL 5: ENVIRONMENTAL SUSTAINABILITY

Minimize transportation-related greenhouse gas emissions that contribute to global climate change; avoid, minimize, and mitigate the environmental impacts of the transportation system on the natural environment and historic and cultural resources; and design and maintain a transportation system that is resilient in the face of climate change.



GOAL 4: EQUITY

Provide convenient, affordable transportation options that enable all people, regardless of age, ability, race, ethnicity, or income, to access jobs, services, and other destinations to meet their daily needs; engage traditionally underrepresented groups; and ensure that the benefits of the regional transportation system are fairly distributed, taking into consideration current inequities resulting from past decisions, and that environmental justice populations are not disproportionately impacted.



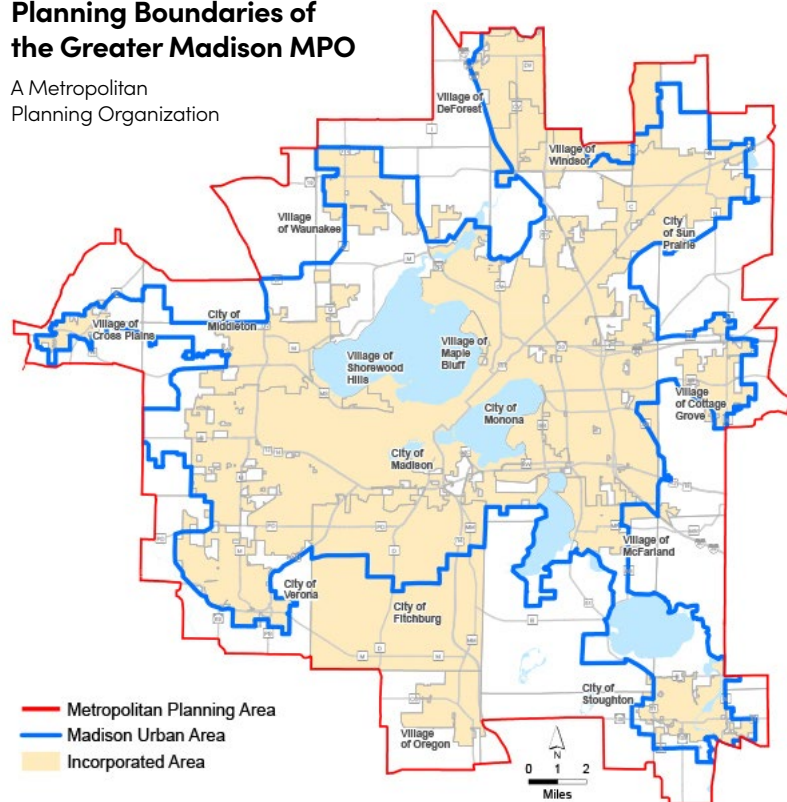
GOAL 6: SYSTEM PERFORMANCE

Maximize the investment made in the existing transportation system by maintaining it in a state of good repair and harnessing technological advances; promote compact development and travel demand management to minimize the need for new roadway lane-miles and maximize mobility options; and manage the system to maximize efficiency and reliability.

decision-making process for the Madison Metropolitan Planning Area (Map EX-a). The goal of the MPO's planning and programming processes is to build regional agreement on transportation investments that balance roadway, public transit, bicycle, pedestrian, and other transportation needs to support regional land use, economic development, and environmental goals.

Planning Boundaries of the Greater Madison MPO

A Metropolitan Planning Organization



Map EX-a Planning Boundaries of the Greater Madison MPO

How Will the Region Grow?

Demographic changes, commuting patterns, economic shifts, and land use development patterns all influence the type, location, and amount of demand on transportation facilities and services. It is particularly important to plan for these changes in the greater Madison region—the fastest growing and changing region in the state. The Madison area is outpacing the rest of the state in all key economic indicators, including job creation, business growth, and construction activity. The area's population is also growing more rapidly than the rest of the state and becoming increasingly diverse.

Dane County is expected to grow 35% by 2050, adding nearly 195,000 additional people

POPULATION

Between 2010 and 2020, while the state population grew just 4%, Dane County grew by 15%—accounting for more than one-third of the state's total population growth. This rapid population growth is expected to continue over the coming decades, as shown in Figure EX-a. Dane County is

Dane County Projected Population Growth

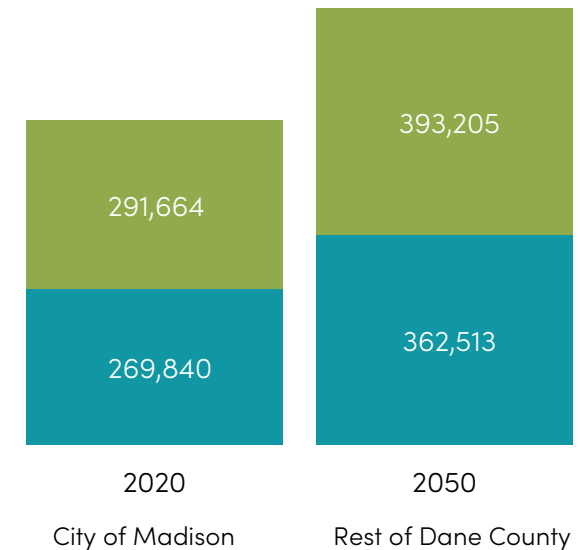


Figure EX-a Dane County Projected Household Growth

Dane County Projected Employment Growth

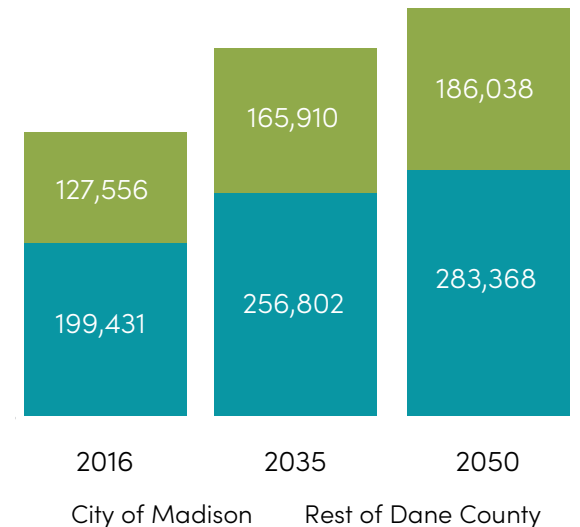
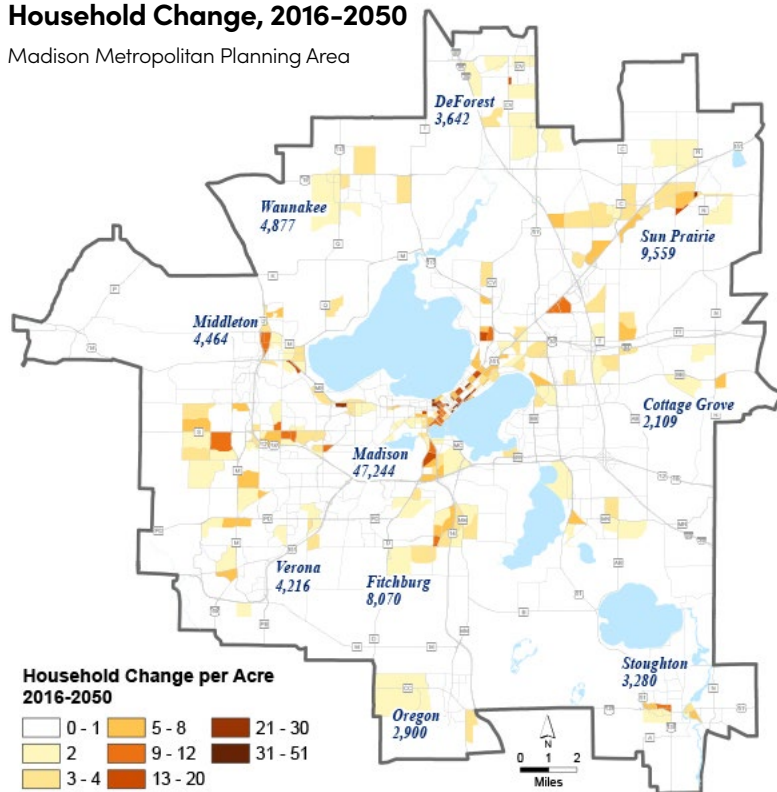


Figure EX-b Dane County Projected Employment Growth

Household Change, 2016-2050

Madison Metropolitan Planning Area



Map EX-b Household Change, 2016-2050

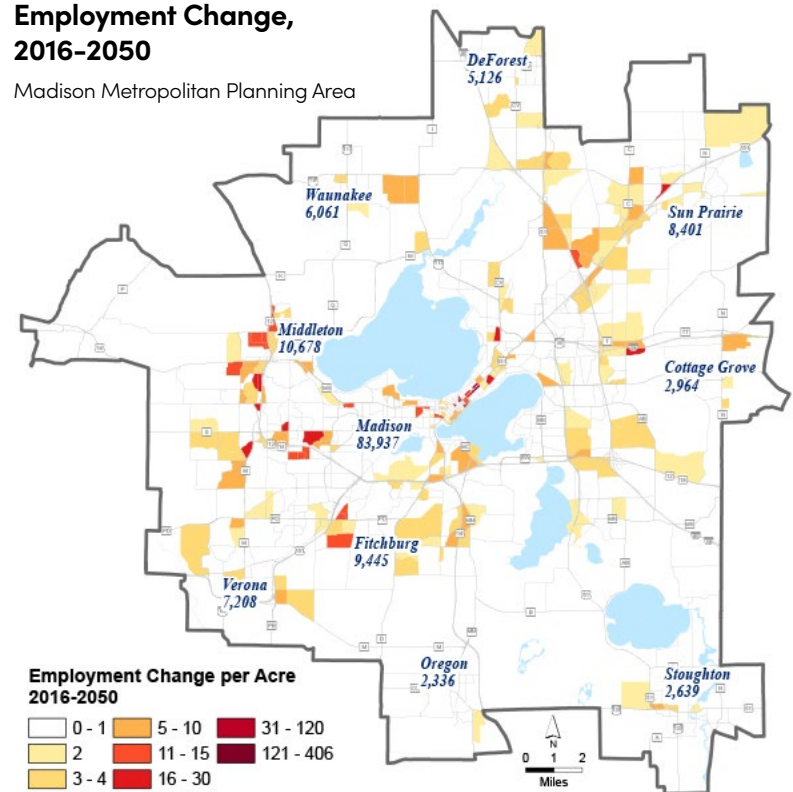
expected to gain nearly 100,000 households by 2050, with about two-thirds of those expected in the City of Madison and its inner ring of adjacent suburban communities (see Map EX-b).

EMPLOYMENT AND THE ECONOMY

Dane County's thriving and diverse economy has led to one of the lowest unemployment rates in Wisconsin, and this trend is expected to continue in the coming years (see Figure EX-b). Employment in the City of Madison is expected to grow by more than 80,000 by

Employment Change, 2016-2050

Madison Metropolitan Planning Area



Map EX-c Employment Change, 2016-2050

2050, with the remainder of Dane County's job growth is expected to occur in suburban communities, as shown in Map EX-c.

Dane County is expected to add approximately 140,000 jobs by 2050

Our Transportation System Tomorrow: 2050

What will our transportation system look like in 2050? What critical issues and drivers of change will shape how our transportation system grows and evolves? How do we leverage transportation to achieve our long-term vision for the region? The way our transportation system will evolve over the next three decades will be shaped by countless public and private decisions at all levels. *Connect Greater Madison 2050* includes a detailed analysis of current and future transportation needs in the region, taking

into account critical issues that will need to be considered in all levels of planning and decision-making. *Connect Greater Madison 2050* provides the framework for prioritizing multimodal investments in the transportation system and includes recommendations necessary to meet the region's mobility needs now and in the future, supporting the region's vision and goals.

CRITICAL ISSUES

As the greater Madison region's transportation system evolves, three critical issues that play an important role in planning and decision-making include equity,

climate change, and health. Each is directly affected by the benefits and burdens of the transportation system, and each deeply affects quality of life.

Central to local and regional agencies' ability to act on equity, climate change, and health is the effective coordination of transportation and land use strategies that naturally support these goals. The foundation for this is community design that provides access for all to transportation options, affordable housing, and other basic needs, thereby fostering equitable access to opportunity, wise use of natural resources, and the ability of individuals to live healthy, sustainable lives. *Connect Greater Madison 2050* centers these critical issues at the heart of its analysis of needs, recommendations, and identification of multimodal investments.

DRIVERS OF CHANGE

Drivers of change are the new technologies and technology-enabled ways of doing things that are changing the way people use the transportation system. Telework, e-commerce, shared mobility, vehicle electrification, connected autonomous vehicles, and other recent advancements in intelligent transportation systems (ITS) represent major departures from the 20th century status quo. As they become more prevalent, and increasingly intertwined, their impact on the transportation system will be profound in ways not easy to predict. The region's transportation system will need to be resilient and adaptable to these



evolutionary changes. The MPO will continue to stay up to date on these rapid changes, and will evaluate a range of scenarios using its regional travel forecast model to inform current and future planning efforts, including major regional corridor studies.

CONNECT GREATER MADISON 2050 RECOMMENDATIONS

Connect Greater Madison 2050 includes a detailed analysis of the region's transportation system needs and a series of project and policy recommendations with supporting actions for each mode of transportation, including:

- Land use and Transportation Integration
- Roadways
- Transportation System Management and Operations (TSMO) and Technology
- Public Transit
- Specialized Transit
- Bicycles
- Pedestrians
- Travel Demand Management (TDM)
- Parking
- Inter-Regional Travel
- Freight, Air, and Rail

Plan recommendations were developed based on analyses of the existing transportation network condition and performance; prior and ongoing transportation planning efforts by the

MPO and implementing agencies; travel forecasts accounting for future growth; and input received from stakeholders through public engagement activities. Plan recommendations are largely focused on optimizing the use, capacity, and safety of existing facilities, expanding transportation options, and improving land use and transportation integration.

Implementing agencies, including local and county governments as well as WisDOT, are encouraged to consult the recommendations and supporting actions identified in *Connect Greater Madison 2050* when undertaking planning efforts and implementing specific transportation projects to ensure regional continuity of the transportation system and support regional transportation plan goals. The following are an excerpt of key plan recommendations.



Land Use and Transportation Integration

Land use and transportation are inextricably linked. The role of transportation is to connect people with opportunities, services, goods, and other resources. In order for transportation policies and investments to be successful in achieving this, they must be coupled with complementary land use plans, policies, and implementing ordinances. Low-density land use patterns increase demand for transportation while reducing the feasibility of transit, biking, and walking. Location-efficient development, that provides dense clusters

of development with a variety of land uses in a pedestrian-oriented environment, gives people easier access to key destinations and reduces transportation costs by making alternative travel modes more convenient and economical.

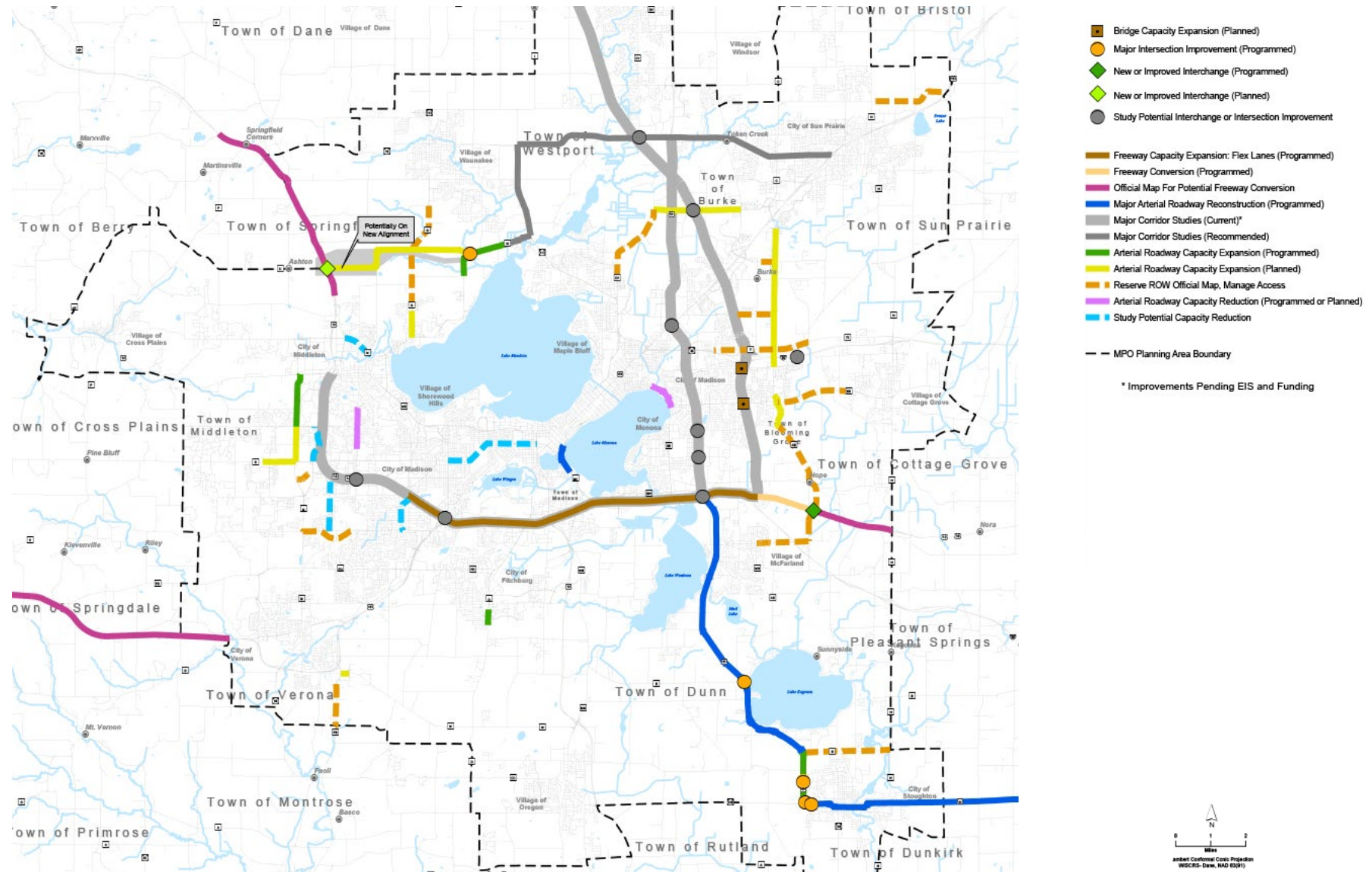
Key Recommendations

- Adopt local land use plans that support RTP goals and policies.
- Provide a mix of housing types with higher densities in areas with multimodal access to jobs and services in order to provide affordable living options in less car dependent neighborhoods.



Major Roadway Projects and Studies

Madison Area, Wisconsin



Map EX-d Major Roadway and High Capacity Transit Projects and Studies



Roadways

Streets and roadways provide mobility for the vast majority of residents in the region, however they travel, but they also make up the majority of our public space, providing areas to walk, play, and socialize with our friends. It is important to preserve this infrastructure and manage it so that it continues to serve our community effectively, making targeted enhancements when appropriate.

Key Recommendations

- Preserve and maintain the region's street and highway system in a manner that minimizes their life cycle cost, maintains safety, and minimizes driver costs while reducing their impact on the environment.
- Build a well-connected network of regional roadways to accommodate future growth, efficiently distribute traffic to avoid bottlenecks on overburdened routes, and providing multimodal connections between neighborhoods.
- Incorporate complete streets and green streets concepts for regional and local roadways.
- Expand regional roadway system capacity to address critical bottlenecks and accommodate future planned growth consistent with RTP goals (see Map EX-d).
- Adopt a Safe System Approach for addressing safety needs on the regional roadway system.
- Address security and resiliency needs related to the regional roadway system.



Transportation System Management and Operations (TSMO) and Technology

Transportation system management and operations (TSMO) includes strategies such as improved traffic signal operations, management of roadway incidents, and traveler information, as well as targeted roadway modifications to provide bottleneck relief. Intelligent Transportation Systems (ITS) technologies, such as sensors and communications devices that allow multiple agencies to work together, can aid these TSMO strategies. TSMO strategies are cost effective methods to improve travel conditions and maximize the benefits of existing transportation infrastructure.

Transitioning away from traditional fossil fuels toward electric powered vehicle technology represents one way in which Dane County can decrease emissions, slowing global warming and reducing our reliance on imported fossil fuels. Expanding access to charging infrastructure, increasing familiarity with electric vehicles, and easing range anxiety will be key strategies to help the region shift towards cleaner transportation options.

Key Recommendations

- Develop a regional transportation systems management and operations (TSMO) plan.
- Promote electric vehicle charging infrastructure to reduce greenhouse gas emissions.

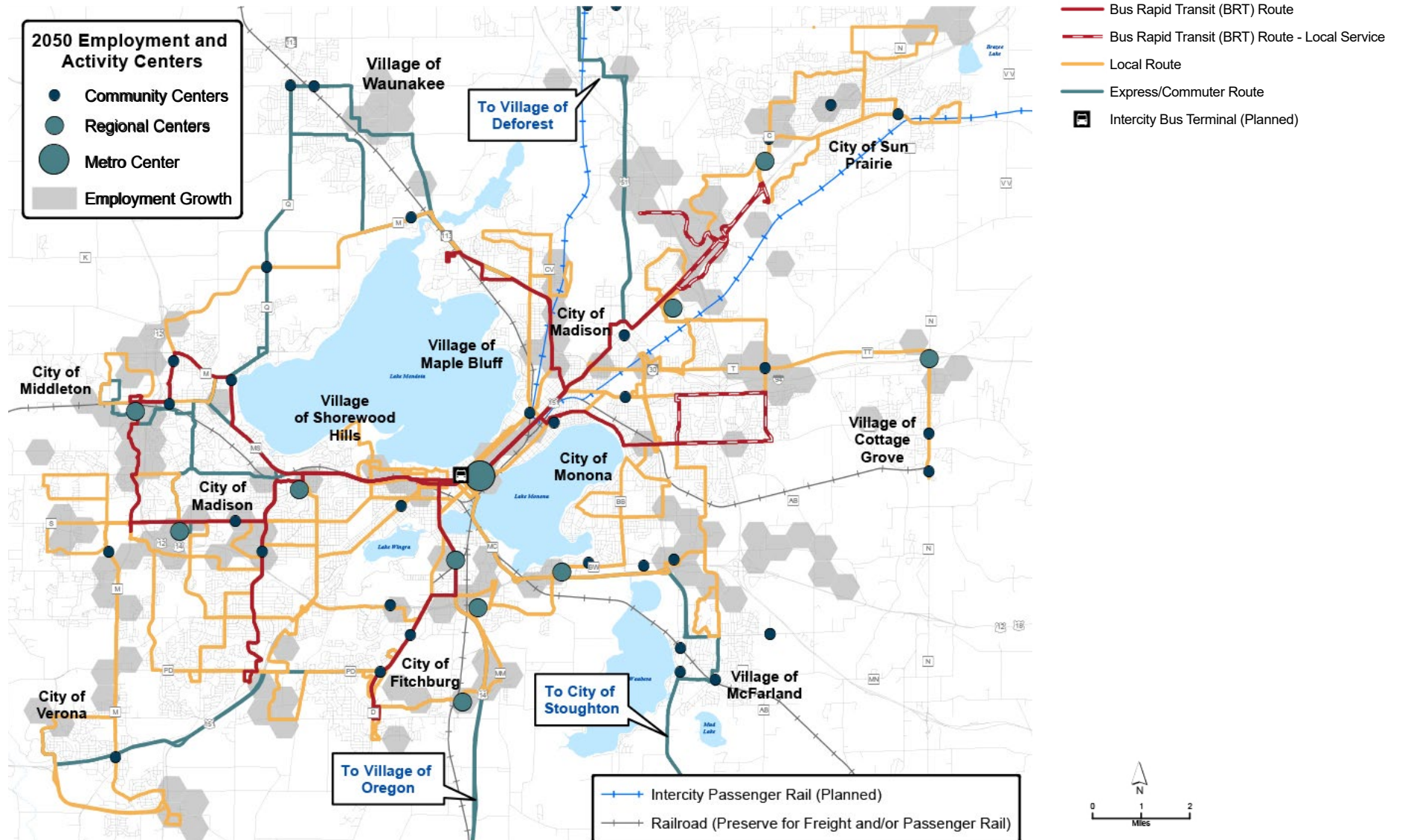


Public Transit

With the goal to provide frequent and more direct transit service, better access to jobs, and make the system overall easier to use, the Metro Network Redesign project is taking place concurrently with the development of this Regional Transportation Plan. The transit element of this plan builds upon this network redesign effort and the initial BRT project to identify a long-term vision for the regional transit system. This vision includes an expanded BRT system, addition of regional express routes, and local service improvements and expansion that together

Future Planned Regional Transit Service Network

Madison Area, Wisconsin



Map EX-e Future Planned Regional Transit Service Network

will greatly increase job accessibility and also significantly expand the “frequent transit network” (15 minute service or better throughout the day), which allows people to live “car light” or “car free.” (see Map EX-e)

Key Recommendations

- Implement a bus rapid transit (BRT) system.
- Improve the local bus network by investing where needs are greatest.
- Implement a regional express bus network.



Bicycles

Although the region’s bikeway network is well developed compared to peer metropolitan areas, gaps in the network persist, particularly outside the central Madison area. Top priorities over the coming decades include connecting and increasing access to low-stress bike routes, improving bicyclist safety, and removing barriers that keep people from bicycling. Map EX-f details the planned future regional bicycle routes.

Key Recommendations

- Reduce barriers to bicycling.
- Expand the bikeway network with new shared-use paths and on-street facilities.
- Improve bicyclist safety.
- Continue bike share, education, and bicyclist supportive policies.



Pedestrians

All trips, regardless of mode used, begin and end with a walk trip.

Sidewalks provide many benefits, including safety, mobility, and healthier communities. Sidewalks, along with street crossing facilities, such as curb ramps, crosswalks, signals, and grade-separated crossings, are the building blocks of the pedestrian transportation network. Local communities should focus on maintaining and improving these existing facilities, and expanding the network to serve poorly connected neighborhoods and new developments.

Key Recommendations

- Provide sidewalks and appropriate pedestrian amenities in developing neighborhoods, and retrofit regional streets with modern, safe, and accessible pedestrian accommodations.
- Improve safety and usability for pedestrians at intersections and crossings.

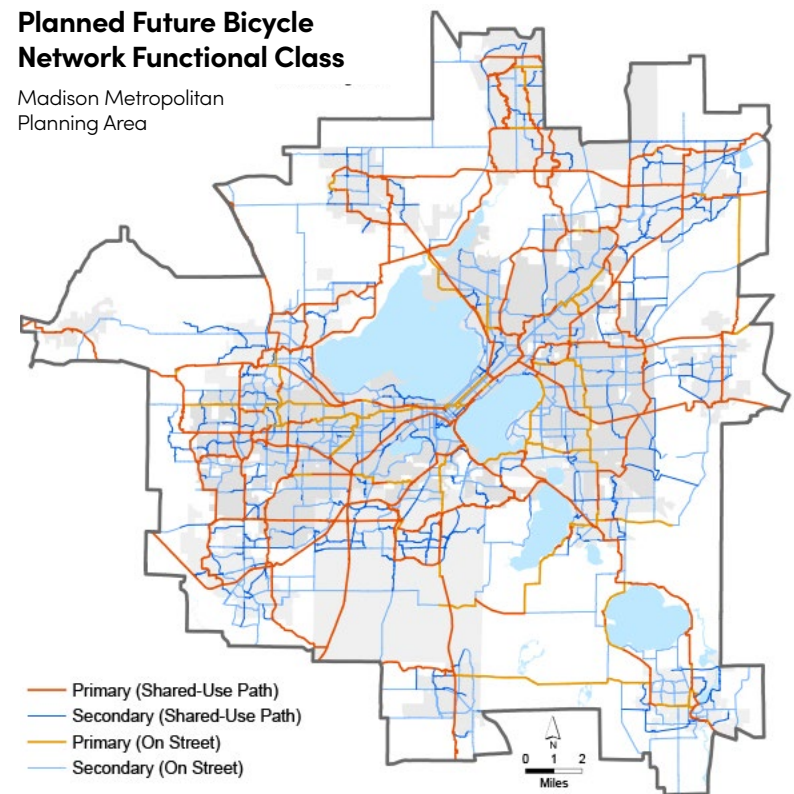


Travel Demand Management

Transportation demand management (TDM) improves transportation system efficiency—reducing vehicle miles traveled and peak period roadway congestion—by maximizing the availability and use of alternatives to driving alone. TDM is a low-cost way to improve community health and livability by nudging travelers to adjust how or when they travel.

Planned Future Bicycle Network Functional Class

Madison Metropolitan Planning Area



Map EX-f Planned Future Bicycle Network Functional Class

Key Recommendations

- Expand the availability and use of facilities and services that support shared mobility.
- Work with employers, institutions, and municipalities to implement and promote strategies to reduce drive-alone vehicle trips.
- Expand the availability, use, and funding of financial incentives and encouragement programs, and increase the funding available to market these programs.

**Inter-Regional Travel**

In an increasingly connected world, inter-regional travel opportunities must be maintained and expanded.

While the Madison area hosts several intercity-bus options, they lack a common terminus and often lack good connections to local bus routes. While Madison's passenger rail service ended decades ago, there is growing interest in renewing it and a funding opportunity through the recently passed federal infrastructure bill.

Key Recommendations

- Initiate planning for and build an inter-city bus terminal.
- Support new and improved inter-city bus service.
- Implement passenger rail service to and through the Madison area.

Investing in the Region's Transportation Future

BY THE NUMBERS

Connect Greater Madison 2050 identifies nearly \$12.5 billion in regional multimodal investments over the next three decades: \$6.4 billion for programmed and planned roadway projects; \$3.3 billion for maintenance and operations of nearly 700 miles of regional roadways and bridges; \$2.5 billion for Metro Transit capital and operation expenses, including BRT; and \$320 million for new off street bicycle and pedestrian facilities, including 131 miles of priority multi-use paths.

FUNDING THE PLAN

Federal rules require that RTPs be fiscally constrained to ensure that planned projects are likely to be feasible using current or expected new funding sources. This requirement forces MPOs to realistically assess their region's ability to fund the plan and to identify new funding sources if necessary; it also forces MPOs to engage stakeholders in difficult decisions regarding priorities and prevents the RTP from devolving into a "wish list" of projects.

Increased state and/or local funding is needed to maintain, let alone reverse the trend of declining pavement condition. The ability to fund major state highway

projects coming out of the current studies is uncertain, depending on the scope of those projects. Sufficient funding will be available to fund arterial roadway projects and major regional shared use paths. The state gasoline tax rate will need to be increased and eventually other new revenue sources (e.g., mileage based registration fee) created in order to offset lost gas tax revenue from electrification of the fleet and inflationary increases in project costs and address long-term system preservation needs. Increased funding will also be needed to fully implement the planned regional transit system, in particular the latter two phases of the BRT system and most of the additional service hours from frequency improvements, new service to developing areas, and commuter express service to suburban communities. Implementation of the plan would require a new regional funding mechanism, such as a regional transit authority, with the ability to levy a sales tax.

EVALUATING PLAN PERFORMANCE

To gauge progress on plan goals, the MPO developed a number of performance measures that it will track and report on regularly. Some of these measures are federally required, while others have been identified by the MPO or by CARPC as part of the Regional Development Framework (RDF).



Chapter 1: Introduction

Introduction

Purpose of the Plan

THE MADISON REGION IS GROWING

The Greater Madison Area is growing. From 2000–2020 the Dane County population grew by 32% – adding almost 135,000 people. Between 2020 and 2050, the population is forecast to grow by another 178,000 to 739,000. By 2050 the county is also expected to add around 96,000 jobs. To accommodate that growth, the region must have an

integrated, well-planned transportation network that meets the needs of all who live, work, or play here.

THE TRANSPORTATION SYSTEM IS THE REGION'S BACKBONE

The region's transportation system provides critical connections to commerce, employment, health care, education, and recreation, as well as quick and efficient movement of goods and services. An integrated multi-modal transportation system provides multiple options for commuting, shopping, leisure, and regional travel. Transportation can have an impact on the

affordability of neighborhoods and communities and have an impact on the viability of community development. The transportation network also has a direct impact on the quality of life in the region. Safe and efficient regional transportation facilities ensure convenient business and leisure travel. An integrated, well-connected network makes traveling by all modes

convenient and enjoyable. The network can also help to foster community with streets acting as community gathering and meeting spaces. A high quality transportation system with transit and bicycling options is also important for businesses in attracting young, educated, and skilled workers. National surveys have shown this is one of the top criteria of Millennials in choosing where to live. Finally, the transportation system affects the environment both directly and indirectly, including being the second largest source of greenhouse gas emissions in Dane County. The Regional Transportation Plan provides an opportunity to carefully consider how we can leverage transportation investments to achieve our regional goals in all of these areas: community development; the economy; the environment; equity; and quality of life.

THE TRANSPORTATION SYSTEM IS EVOLVING

The purpose of the *Connect Greater Madison* Regional Transportation Plan (RTP) for 2050 is to identify how the region intends to invest in the transportation system to accommodate current travel demands and future growth, while setting investment priorities balancing limited funds. The plan will also include strategies to begin to address important trends such as rapidly evolving transportation technology and the rise of teleworking, as well as addressing critical issues, including equity and climate change.



How to Navigate the Plan

Chapter 1: Introduction

Provides background, plan goals, planning requirements

Chapter 2: Trends and Forecasts

Demographic trends and forecasts, planned land use development, and economic and travel trends

Chapter 3: Our Transportation System Today

Inventory and performance of our existing transportation system

Chapter 4: Our Transportation System Tomorrow

Planned future multimodal transportation network and recommendations on how we get there

Chapter 5: Financial Analysis

How we will fund the future transportation network

What is the Regional Transportation Plan?

The RTP sets the framework for the future of transportation in the Madison region. The RTP is an integrated, multi-modal plan that articulates how the region intends to build, manage, and operate a multi-modal transportation system (including transit, highway, bicycle, pedestrian, and other modes) to meet the region's economic, transportation, development, and sustainability goals. The RTP defines the transportation goals for the region and specifies the policies, projects, and strategies that will achieve these goals. Additionally, the plan ties goals to performance measures and sets performance goals to track the region's progress in meeting plan goals. Further, a board approved and USDOT accepted RTP is required for a metropolitan area to be eligible to receive federal funding for transportation projects.

The RTP acts as a transportation investment guide that the MPO, local jurisdictions, and the Wisconsin Department of Transportation use to ensure a unified

regional transportation network. As a “fiscally constrained” plan, the RTP must demonstrate that the projects listed in the plan can be implemented using committed, available, or reasonably available revenue sources. The RTP must be updated every five years and provide a plan that covers a minimum of 20 years. Finally, the plan will ensure eligibility of projects for federal transportation funding as the plan serves as the framework for guiding federally funded transportation investments.

¹ <https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/financial-planning-fiscal-constraint>



Plan Goals

In 2015 the MPO teamed up with the Capital Area Regional Planning Commission (CARPC) to conduct the Greater Madison Region Values and Priorities Survey to determine the values and priorities of area residents to ensure that planning decisions speak to and correspond with the desires of the region's residents. This extensive public engagement process informed the development of a set of goals that represent overarching aspirational statements about desired vision for the region that was established in preceding regional transportation plan, *The Regional Transportation Plan 2050: Charting Our Course*. A public survey conducted in spring 2021 showed continued support for the existing goals², which form the foundation for the remainder of this plan.



GOAL 1: LIVABLE COMMUNITIES

Create connected livable places linked to jobs, services, education, retail, and recreation through a multimodal transportation system that supports compact development patterns, increasing the viability of walking, bicycling, and public transit.



GOAL 2: SAFETY

Ensure that the transportation system enables all people to get to where they need to go safely with an emphasis on enhanced protection for vulnerable roadway users through use of a safe systems approach, thereby helping to achieve the long-term goal of eliminating fatal and serious traffic injuries.



GOAL 3: PROSPERITY

Build and maintain a transportation system that provides people with affordable access to jobs, enables the efficient movement of goods and services within the region and beyond, and supports and attracts diverse residents and businesses, creating a shared prosperity that provides economic opportunities for all.



GOAL 4: EQUITY

Provide convenient, affordable transportation options that enable all people, regardless of age, ability, race, ethnicity, or income, to access jobs, services, and other destinations to meet their daily needs; engage traditionally underrepresented groups; and ensure that the benefits of the regional transportation system are fairly distributed, taking into consideration current inequities resulting from past decisions, and that environmental justice populations are not disproportionately impacted.



GOAL 5: ENVIRONMENTAL SUSTAINABILITY

Minimize transportation-related greenhouse gas emissions that contribute to global climate change; avoid, minimize, and mitigate the environmental impacts of the transportation system on the natural environment and historic and cultural resources; and design and maintain a transportation system that is resilient in the face of climate change.



GOAL 6: SYSTEM PERFORMANCE

Maximize the investment made in the existing transportation system by maintaining it in a state of good repair and harnessing technological advances; promote compact development and travel demand management to minimize the need for new roadway lane-miles and maximize mobility options; and manage the system to maximize efficiency and reliability.

² Slight modifications and restructuring were made to the new goal statements to make them easier to communicate, however the intent of each of the goals from the previous plan remains the same. A 7th goal from the previous plan, Establish Financial Viability of the Transportation System, was removed as it is embedded in many of the other goal statements.

The Role of the Greater Madison MPO

The Greater Madison MPO is the designated metropolitan planning organization (MPO) responsible for overseeing the continuous, comprehensive, and cooperative (3-C) transportation planning decision-making process for the Madison Metropolitan Planning Area (Map 1-a). MPOs are federally designated decision-making bodies for metropolitan areas with populations greater than 50,000, which guide decisions about how federal transportation funds for planning studies, capital projects, and services will be programed in the region. MPOs help facilitate implementing agencies (including local municipalities, transit providers, and state departments of transportation) in the planning and prioritization of their transportation investments in a continuing, comprehensive, and cooperative (3-C) process consistent with regional goals, policies, and needs, as outlined in a long-range regional transportation plan.

The goal of the MPO planning and programming processes is to build regional agreement on transportation investments that balance roadway, public transit, bicycle, pedestrian, and other transportation needs and support regional land use, economic development, and environmental goals.

The MPO is a regional transportation planning agency and approves use of federal transportation funding; the MPO is not an implementing agency that builds facilities or operates transit service. The following outlines the key responsibilities of the MPO and those that fall with other agencies and local communities.

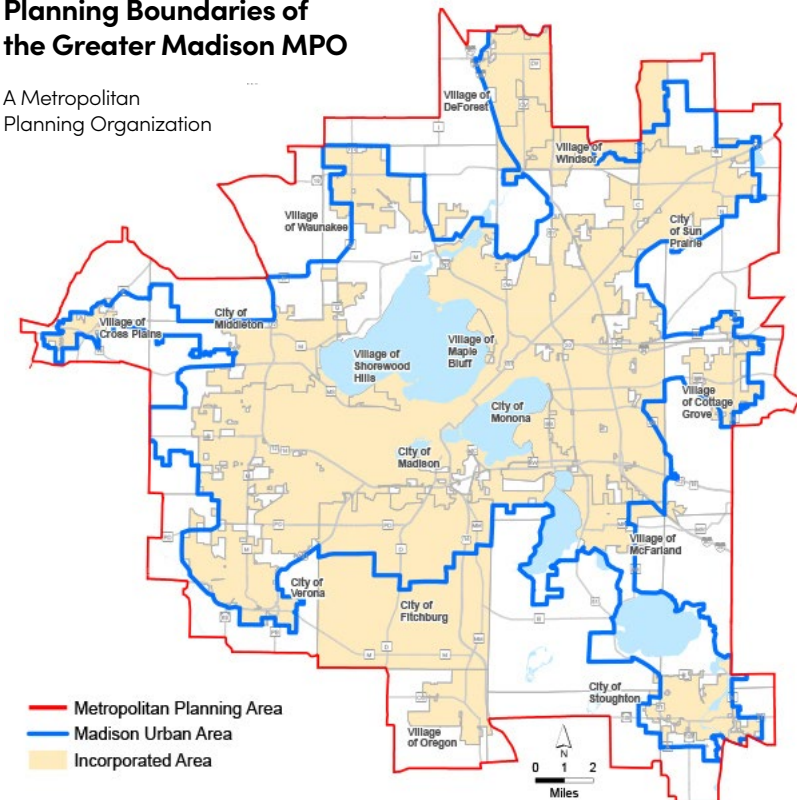
What the MPO does:

- Prepare a long range (20+ year) regional transportation plan for all modes of travel, which is updated every 5 years
- This involves:
 - Collaborating with stakeholders including WisDOT, Metro Transit, other transportation providers, Dane County, and local communities;
 - Analyzing short- and long-term transportation needs; and
 - Making policy, strategy, and project recommendations.
- Provide a forum for regional transportation decision making
- Approve Federal funding for projects in the region³
- Conduct public engagement
- Administer the RoundTrip Travel Demand Management (TDM) program

³ Federally funded projects must be identified in (in the case of major capacity expansion projects) or determined to be consistent with the Regional Transportation Plan.

Planning Boundaries of the Greater Madison MPO

A Metropolitan Planning Organization



Map 1-a Planning Boundaries of the Greater Madison MPO

What the MPO does not do:

- Design, construct or maintain roadways or multi-use paths
- Traffic control (e.g., signs and signals) and enforcement
- Operate public transit service or design and construct transit capital facilities
- Land use planning and zoning

Federal Regional Transportation Planning Requirements

The metropolitan transportation planning process is directed by the most recent federal transportation authorization legislation, statutes codified in the United States Code of Laws (U.S.C), and regulations in the Code of Federal Regulations (CFR). 23 U.S.C and 49 U.S.C establish the continuing, cooperative, and comprehensive (3-C) metropolitan planning process that the MPO follows to ensure regional cooperation in transportation planning.

REGIONAL TRANSPORTATION PLAN REQUIREMENTS

The MPO is required to develop a regional transportation plan⁴ with no less than a 20-year planning horizon, which must be updated every 5 years. The plan shall include both long-range and short-range

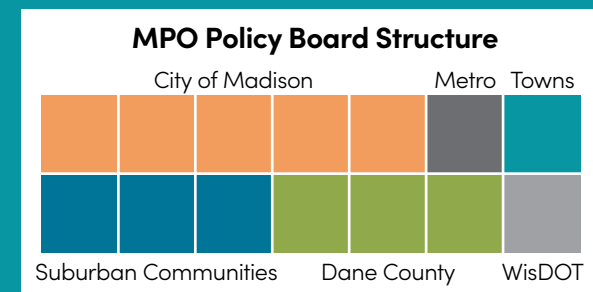
MPO Organizational Structure

MPO POLICY BOARD

The MPO is governed by a 14-member Policy Board appointed by the local units of government within the Metropolitan Planning Area, Dane County, and Wisconsin Department of Transportation (Figure 1-1). The Policy Board is the decision-making body for the organization. Federal law requires that the Policy Board shall consist of:

- Elected officials;
- Officials of public agencies that administer or operate major modes of transportation in the metropolitan area; and
- Appropriate State officials.

A listing of the current Policy Board members, meeting calendar, and past meeting minutes can be accessed at <https://www.greatermadisonmpo.org/meetings/tpb.cfm>.



TECHNICAL COORDINATING COMMITTEE

The Technical Coordinating Committee (TCC) is a multi-modal planning advisory and coordinating committee. It includes members representing various agencies or facets of transportation planning and consists of 14 voting members, 6 alternate voting members, and 2 non-voting members representing the U.S. Department of Transportation. While the MPO Board serves as the policy body for the MPO, the TCC reviews, coordinates, and advises on transportation planning matters. MPO staff reviews all draft plans, policies, project recommendations, TIPs, and other documents with the TCC, which then makes recommendations to the MPO Board. The TCC also plays an important information sharing and coordinating role.

A listing of the current TCC members, meeting calendar, and past meeting minutes can be accessed at <https://www.greatermadisonmpo.org/meetings/tcc.cfm>.

⁴ 23 CRF 450.324

strategies and actions that provide for the development of an integrated multimodal transportation system. The plan must include:

- Analysis of the current and future transportation demand of persons and goods in the region
- Inventory of existing and proposed transportation facilities (including roadways, public transit facilities, pedestrian walkways, and bicycle facilities)
- Performance measures and targets used in assessing the performance of the transportation system
- A system performance report evaluation the condition and performance of the transportation system
- Operational and management strategies to improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods
- Assessment of capital investment and other strategies to preserve the existing and projected future metropolitan transportation infrastructure, provide for multimodal capacity increase based on regional priorities and need, and reduce the vulnerability of the existing transportation infrastructure to natural disasters.
- Transportation and transit enhancement activities
- A discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the transportation plan
- A fiscally constrained financial plan that demonstrates how the adopted transportation plan can be implemented

The Infrastructure Investment and Jobs Act (IIJA)

The Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law), signed into law on November 6, 2021, is the most recent surface transportation infrastructure planning and investment legislation. The IIJA represents a historic investment in the nation's infrastructure, adding around \$550 billion in new Federal infrastructure investment, including \$350.8 billion for highway programs and \$89.9 billion for public transit. Priorities include focusing on climate change mitigation, resilience, equity, and safety for all users, as well as ensuring every American has access

National Transportation Planning Factors

- **Economic Vitality:** Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
- **Safety:** Increase the safety of the transportation system for motorized and non-motorized users.
- **Security:** Increase the security of the transportation system for motorized and non-motorized users.
- **Accessibility & Mobility:** Increase the accessibility and mobility of people and freight.
- **Environment & Quality of Life:** Protect and enhance the environment, promote energy conservation, improve the quality of life and promote consistency between transportation improvements and planned growth patterns.
- **Connectivity:** Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.
- **Efficiency:** Promote efficient system management and operation.
- **Preservation:** Emphasize the preservation of the existing transportation system.
- **Resiliency & Reliability:** Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.
- **Travel & Tourism:** Enhance travel and tourism.

to reliable high-speed broadband internet. The IIJA maintains the same requirements for MPOs from previous authorizations, including the FAST- Act most recently and Moving Ahead for Progress in the 21st Century (MAP-21), while adding an increased emphasis in coordinating transportation planning with housing, complete streets, and encouraging MPOs to use social media and other web-based tools to drive public participation.

HOW TRANSPORTATION PROJECTS GET FUNDED

Most major transportation projects are funded through a mix of federal, state, and

local funding. Likewise, projects can have a variety of lead agencies that are responsible for planning, construction, and maintenance, including communities, counties, and states. To ensure a unified metropolitan transportation planning process, FHWA's Metropolitan Planning Program provides funding for MPOs to act as a coordinating agency. The MPO works with all stakeholders involved on projects to ensure a seamless transportation network and logical timing of project construction, and to eliminate duplicity between communities. Agreed upon projects must first be identified in the RTP and are then added to the Transportation Improvement Program (TIP). Projects that are not in the TIP cannot receive federal transportation funding.

A PERFORMANCE-BASED APPROACH

In 2012, MAP-21 introduced a requirement for MPOs to take a performance-based approach to planning and programming to address challenges facing the national transportation system, including safety, infrastructure condition, and system reliability. The IIJA continues this transition towards a performance-based, outcome-driven approach. This performance-based approach will produce measurable outcomes that can influence future funding decisions.

Figure 1-b illustrates the MPO's performance-based planning and programming framework. The MPO began tracking performance

measures in 2016 in an annual Performance Measures Report, which the MPO will be transitioning into an interactive online data dashboard. The measures include all federal performance measures as well as additional measures aligned to the RTP goals. The federal measures are tracked in the RTP System Performance Report in Appendix B, as well as in the TIP along with an evaluation of projects that will help achieve the MPO federal measure targets.

The Planning Process

The *Connect Greater Madison 2050* Regional Transportation Plan was developed over a two-year time period beginning in late 2020. Work to prepare for the planning process started well before this, including a household travel survey conducted in 2017 and development of an updated, improved regional travel forecast model in 2019-'21. The planning process concluded in the spring of 2022 following a phased approach, with the public engagement process occurring concurrently. MPO staff regularly consulted the Policy Board and TCC on plan development activities throughout the whole process.

PHASE 1: EXISTING CONDITIONS ANALYSIS, GROWTH FORECASTS, AND GOAL DEVELOPMENT

In late 2020 MPO staff began to collect data and analyze existing conditions. Data trends related to demographics, the economy, land use development, travel,



Performance-Based Planning and Programming Framework

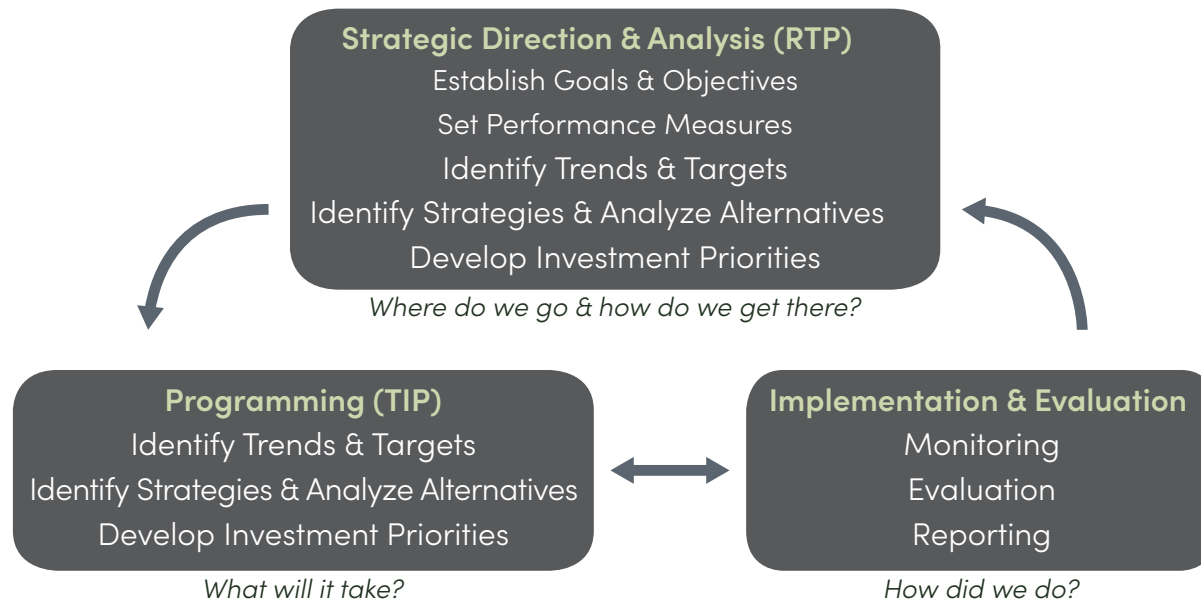


Figure 1-b Performance-Based Planning and Programming Framework

and transportation system performance were examined and their relationship to plan goals and performance measures established. These baseline conditions formed the foundation for the rest of the RTP. Local municipal staff completed a survey to identify their community's top short- and long-term transportation priorities, future planning activities, and biggest transportation challenges or concerns. MPO staff worked with Capital Area Regional Planning Commission (CARPC) staff to prepare county and municipal population, household, and employment forecasts. The MPO then coordinated the work of CARPC and City of

Madison planning staff in preparing future year 2035 and 2050 growth scenarios, which were used to forecast future traffic zone level households and employment by general type used in the regional travel model. The first round of public involvement activities during this phase included a public survey, focus group discussions with traditionally underrepresented populations, and online public involvement meetings which in turn helped refine the plan goals and begin identifying critical needs. A dedicated RTP website was launched during this time to publish data and other findings, as well as to provide opportunities for public comment.

Federal Performance Measures

The federal performance measures established in 23 CFR 490 and 49 CFR 625 and 630 include:

- Highway Safety Performance Measures (PM1)
- Pavement and Bridge Performance Measures (PM2)
- System Performance Measures (PM3)
- Transit Asset Management Plan (TAM)
- Public Transportation Agency Safety Plan (PTASP)

PHASE 2: DEVELOPMENT AND PRIORITIZATION OF IMPROVEMENT PROJECTS AND STRATEGIES

Beginning in late summer of 2021, MPO staff analyzed the existing conditions in combination with traffic forecasts to conduct gap and need analyses. These analyses were used to develop improvement strategies and projects consistent with plan goals, and determine the capital requirements, operational strategies, and land use policy changes that may be needed in combination with these strategies and projects. An online interactive map commenting tool was launched to allow the public to identify

specific needs, barriers or concerns, as well as aspects of the current transportation system that they thought were doing well, followed by a second round of online public involvement meetings presenting draft facility recommendations. The public involvement meetings sought feedback on the recommendations that MPO staff developed, as well as suggestions for additional projects. Feedback from these activities helped inform the prioritization of projects and strategies.

PHASE 3: FINANCIAL CAPACITY ANALYSIS AND DRAFT PLAN

In early 2022 staff completed a financial capacity analysis. This analysis determined which projects and strategies from the prioritized list would be included in the plan based on available funding, ensuring that any recommendations made in the RTP could be completed between now and 2050 using cost and revenue estimates. Once prioritized, the draft RTP was completed. During this same period environmental justice and environmental analyses of the draft RTP were completed to evaluate the impacts of the RTP on minority, low-income, and autoless households and screen major projects for potential environmental impacts. It should be noted that environmental justice (EJ) analysis was conducted and equity considered throughout the planning process with projects identified and prioritized based on their importance in serving the Tier 1 and 2 EJ areas identified at the beginning of the process. A final round of online public meetings was

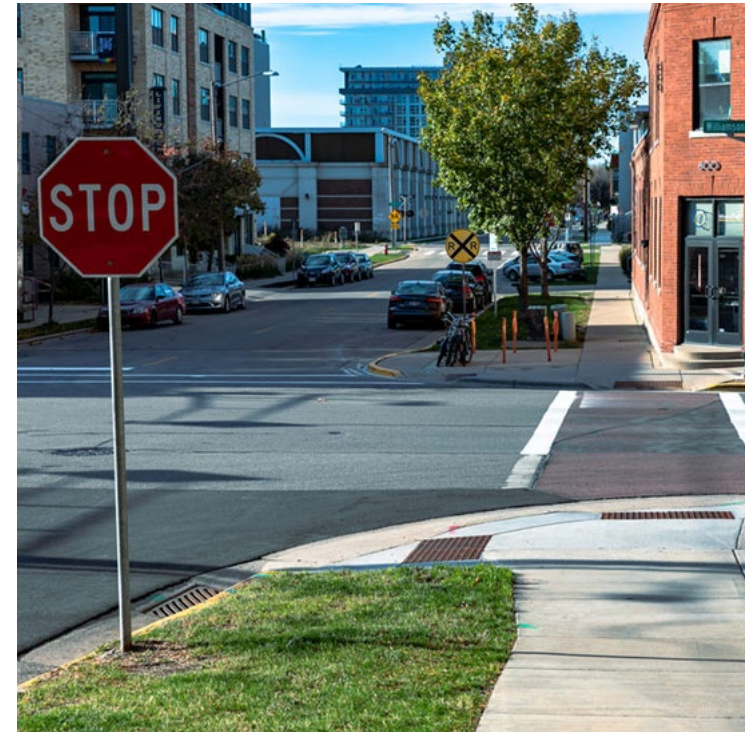
held. The draft RTP was presented to the TCC and the MPO board and made available for public comment. Feedback from the TCC, board, and public was incorporated into the final RTP, which was approved by the MPO board on May 11, 2022 following an official public hearing.

PHASE 4: PLAN IMPLEMENTATION

The MPO adoption of the RTP demonstrates regional agreement on the transportation vision for the metropolitan area. Upon adoption, the RTP implementation and performance measurement will begin. Implementation can include building new facilities, adding transit service, implementing traffic and transit operational improvements, adding new trails, adopting policies, and completing further studies to refine improvements or strategies recommended in the plan.

A COORDINATED APPROACH TO TRANSPORTATION AND LAND USE PLANNING

One of the greater Madison region's key challenges is growth. With Dane County's population projected to grow by 178,000 between 2020 and 2050, our choices about how and where people live, work, and travel set the stage for future quality of life and achievement of other regional goals. This requires the coordination and integration of transportation and land use planning. The Capital Area Regional Planning Commission (CARPC) is the MPO's partner



agency charged with regional land use and areawide water quality management planning. CARPC developed a Regional Development Framework (RDF) is to serve as an advisory resource and guide for local planning and development. The framework addresses regional challenges and aligns local plans and policies with shared regional goals. It also fulfills statutory requirements for RPCs to prepare and adopt a master plan for the physical development of the region. This framework was developed in coordination with the RTP process, with the recommended growth scenario taking into consideration RTP goals and policies

along with local comprehensive plans. The recommended growth scenario developed for the RDF informed the travel forecasts the RTP relies on for the facility, service, and other recommendations to accommodate that future travel demand. As a result, the RDF and RTP are mutually supportive.

THE COVID-19 GLOBAL PANDEMIC AND ITS POTENTIAL LONG-TERM IMPACT ON TRAVEL TRENDS

The outbreak of the COVID-19 global pandemic began just prior to the official start of the RTP planning process. The pandemic has introduced much uncertainty due to its potential long-term impact on land use development and travel trends. While nationally vehicle miles of travel (VMT) has almost returned to pre-pandemic levels, traffic volumes on many major roadways in the Madison area are still down around 10%. In addition, travel has become more spread out throughout the day with weekday peak period volumes down to 60%–70% of pre-pandemic levels on some roadways. A major factor in this is the continued high level of part-time and full-time teleworking, which employers expect to continue according to a survey conducted by the MPO in 2021. Because roadways are designed to meet peak demand, this could impact capacity needs in the future. At the same time, transit service demand may be more spread out through the day. In addition, there are new technologies such as connected, autonomous vehicles and shared mobility services that

are likely to have significant impacts on travel and the transportation system in the future. This highlights the importance of updating the RTP every five years and conducting scenario planning to take into account the uncertainty regarding the future. The MPO intends to use its regional travel forecast model, which was developed based on pre-pandemic household travel characteristics and regional travel patterns, to modify inputs to test the potential impacts of scenarios such as continued high levels of teleworking, more online shopping, shared mobility services, and driverless vehicles.



Relationship to Other Plans, Reports, and Studies

Transportation planning is a continuous process. The *Regional Transportation Plan 2050* (RTP) builds upon a number of prior and current planning efforts, studies, reports, and already programmed transportation projects. Where applicable, recommendations and policies are incorporated from current plans including (but not limited to):

MPO PLANS

2050 Regional Transportation Plan (2017)

The MPO's previous RTP. The 2050 Regional Transportation Plan was a major update to the 2035 RTP update, extending the planning horizon to 2050 and accounting for new and modified land use plans, growth and development, new household, employment and traffic forecasts, and other changes and trends affecting the system since the RTP 2035 Update was adopted in 2012. As with all RTPs, it is an integrated, multi-modal system plan that provides the overall framework for transportation planning and investment decision making in the region. The 2050 RTP was amended three times to add the Beltline Flex Lanes project, the East-West Bus Rapid Transit (BRT) project, and the reconstruction of U.S.H. 51 between Stoughton and McFarland to the official, financially constrained plan.

Bicycle Transportation Plan (2015)

The Bicycle Transportation Plan for the Madison Metropolitan Area and Dane

County is a comprehensive bicycle plan to serve as a blueprint for continuing to improve bicycling conditions and increase bicycling levels throughout Dane County. The planning horizon is 2050. It provides a framework for cooperation between state agencies, Dane County, and local governments in planning for and developing bicycle facilities and programs. It is intended to educate citizens and policy makers on bicycle transportation issues and the needs of bicyclists as well as present resources for planning, designing, and maintaining bicycle facilities. The plan is a component of the the MPO's RTP. The facility plans have been updated as part of the RTPs.

2022-2026 Transportation Improvement Program (2021)

The Transportation Improvement Program (TIP), which the MPO updates annually, is a coordinated listing of short-range transportation improvement projects anticipated to be undertaken in the next five-year period. The TIP is the mechanism by which the long-range RTP is implemented, and represents the transportation improvement priorities of the region.

Projects within the MPO Planning Area must be included in the TIP in order to be eligible to receive federal funding assistance. Outer county area projects are also listed for information and coordination purposes. The list is multi-modal. In addition to streets/roadways, it includes transit, pedestrian and bicycle, parking, and rideshare/transportation demand management projects.

The MPO Performance Measures Report (2019)

The Performance Measures Report (PMR) analyzes progress towards meeting regional transportation goals by assigning measures to RTP goals. The report, which is released annually, is used along with the TIP and RTP in the new performance-based planning process. The annual performance measures report was temporarily paused in 2020 due to the disruption of the COVID-19 pandemic; monitoring will resume in 2022 and be moved to an online platform.

2013-2017 Transit Development Plan (2013)

The Transit Development Plan (TDP) for the Madison Urban Area is a short- to medium-range strategic plan intended to identify transit needs and proposed improvements and studies over a five-year planning horizon. The MPO is responsible for developing and maintaining the TDP. The MPO works in close cooperation with Metro Transit and other transit providers, funding partners, and jurisdictions in the Madison area to develop the plan. The TDP is developed within the overall framework of the long-range RTP. An update to the TDP was put on hold due to the Metro Transit Network Redesign Study, but work on an update will resume in late 2022.

Congestion Management Process (2022)

Metropolitan Planning Organizations with planning area populations over 200,000 are designated as Transportation Management Areas (TMA) by FHWA. In these areas, a Congestion Management Process (CMP) is

required to be developed and implemented as an integral part of the metropolitan planning process. The CMP is an 8-step process, as follows:

- Develop Congestion Management Objectives;
- Identify Area of Application;
- Define System or Network of Interest;
- Develop Performance Measures;
- Institute System Performance Monitoring Plan;
- Identify and Evaluate Strategies;
- Implement Selected Strategies and Manage Transportation System; and
- Monitor Strategy Effectiveness.

The MPO developed its first CMP in 2011 with the intent to address congestion based on a cooperatively developed and implemented metropolitan-wide strategy that provides for the safe and effective management and operation of the multimodal transportation system. Strategies from the CMP are incorporated into the RTP and TIP. Strategies that manage travel demand, reduce single occupant vehicle (SOV) travel, and improve transportation system management and operations are all to be considered, as well as those that explicitly address bicycling and walking.

Madison Bus Rapid Transit

The City of Madison is working to implement a Bus Rapid Transit (BRT) system (Metro Rapid) as part of an effort to improve its

existing transit system and reduce travel times across the region. The first phase of Metro Rapid will consist of corridor that will operate east/west through Madison's downtown and the University of Wisconsin campus areas connecting the West and East Towne areas; a north/south second phase is planned to follow the implementation of phase 1 in 2023-24.

Metro Transit Network Redesign (Anticipated plan completion 2022)

The Metro Transit Network Redesign will design a route system that will better meet the needs of Madison area residents



and businesses by increasing access and frequency, decreasing travel times, and improving the quality of transit riders' experience. The Network Redesign will also eliminate routes that will become redundant with the implementation of Metro Rapid, and is planned for implementation in summer 2023.

Public Participation Plan (2021)

This plan outlines the public participation goals and techniques to be used in the Greater Madison MPO's transportation planning and programming processes. This plan reflects the MPO's ongoing commitment to actively evaluate and improve the public involvement process and to ensure compliance with updated Federal requirements.

STATE DOT PLANS AND STUDIES

Connect 2050 (2022)

Connect 2050 is WisDOT's long-range transportation policy plan for the state of Wisconsin, which will guide WisDOT's decision-making about changes to and investments in our statewide system for the next 30 years. It sets goals and objectives that apply to all the modes and means of transportation in Wisconsin including roads, transit, biking, walking, rail, aviation and water transport. Connect 2050 is intended to set the long-range vision for the state's transportation system, while WisDOT's other plans (as partially listed below) and technical reports will identify how Connect 2050's goals will be met.

Wisconsin State Freight Plan (2018)

The State Freight Plan provides a vision for multimodal freight transportation and positions the state to remain competitive in the global marketplace. The Freight Plan links transportation investments to economic development activities, places Wisconsin within the national and global context, and guides implementation.

Wisconsin Rail Plan 2050 (Anticipated Early 2022)

The Wisconsin State Rail Plan 2050 will include policies for railroad crossings, freight rail, Wisconsin's state-owned rail system, long distance passenger rail, intercity rail, and commuter rail. The plan will specifically discuss rail data trends, existing and possible future service levels, rail system conditions, and commodity freight movements.

Transportation Asset Management Plan (2019)

The TAMP outlines WisDOT's investment strategy over the next ten years (to 2029) to keep the National Highway System safe, efficient and in a state of good repair.

WisDOT SW Region Park-and-Ride System Study (2015)

The Wisconsin Department of Transportation (WisDOT) Southwest Region initiated the Southwest Region Park-and-Ride System Study to create more efficient and sustainable commuting choices and reduce traffic volumes on the state highway system. Park-and-ride system planning work begins with

a location evaluation tool. The first step in the location selection process is identifying areas where park-and-ride lots may be practical, with potential to attract users and meet WisDOT's park-and-ride program goals. The purpose of this report is to present the screening methodology for assessing the most efficient locations for future park-and-ride facilities in the sixteen county study area of the Southwest Region.

Major Corridor Studies

Major highway development projects are generally the most complex and costly projects initiated by the Wisconsin Department of Transportation (WisDOT). They are intended to identify long-term solutions to the most serious deficiencies on highly traveled segments of the highway system. They are currently shown in the RTP as studies, however when the final design concepts and construction funding is approved they will be amended into the RTP.

- **I-39/90 Study** - The Interstate study will analyze the existing and future conditions of the I-39/90/94 corridor, testing several possible transportation improvements and their impact on future corridor conditions.
- **Madison Beltline Study (ongoing)** - The Madison Beltline Planning and Environmental Linkages (PEL) Study is a planning-level analysis of the effectiveness of all possible solutions to the Madison Beltline's current and long-term needs; in particular, determining to what extent possible solutions would address the

existing safety, capacity and geometric issues as well as meet identified study objectives. In addition to improvements to the physical Beltline or crossings of the Beltline, changes or improvements to alternate modes of travel, other area transportation corridors, and existing Beltline connections to the adjacent road network are being analyzed. Following the completion of the PEL Study in 2023 the environmental study process under NEPA will be initiated to further analyze and refine the highest priority improvement concepts selected as part of the preferred strategy package. Following selection of a preferred alternative project and approval of funding final design will begin.

- **US 51 Stoughton Road Corridor Study (ongoing)** - The study limits extend from Terminal Drive/Voges Road in the village of McFarland to the State Trunk Highway (STH) 19 interchange in the village of DeForest. The study passes through the city of Madison, the city of Monona, and the town of Blooming Grove in Dane County. This study will develop and evaluate long-term alternatives to address the safety, congestion, and gaps in the bicycle and pedestrian facility network along this corridor.

REGIONAL PLANS

CARPC Regional Development Framework

CARPC has prepared an update, known as the Regional Development Framework (RDF),

to the *Vision 2020: Dane County Land Use and Transportation Plan*. The Framework draws on public priorities, local government input, and growth projections to establish goals, objectives, and strategies for accommodating future growth in the Dane County region.

The Framework is designed to serve as a guide for incorporating big picture goals into individual decisions about where and how to grow. The strategies outlined in the Framework will promote growth that:

- Reduces greenhouse gas emissions and fosters community resilience to climate change
- Increases access to jobs, housing and services for all people
- Conserves farmland, water resources, natural areas, and fiscal resources

Dane County's North Mendota Parkway Study (2009)

The North Mendota Parkway Study helped develop a series of recommended study areas for a future north-metro parkway route:

- An Eastern Corridor Area between County Trunk Highway (CTH) M and CTH Q;
- A broader Western Corridor Area between the Town of Westport / Town of Springfield line and U.S. Highway 12, and;
- A transition area to connect the Eastern Corridor and Western Corridor areas.

Additionally, the study recommended a natural resource area boundary to protect the environmental, water, scenic, and recreation

resources in the North Mendota area. The plan was adopted and incorporated into the Dane County Parks and Open Space Plan. The county has moved forward with the eastern corridor on existing alignment with a project to reconstruct and expand that section of CTH M to a four-lane divided cross-section with associated bicycle/pedestrian improvements. That project, funded by the MPO, is scheduled for construction in 2023-'24. No further work has been completed on the western corridor on new alignment due in part to the very large cost and difficult issues for such a project.

Dane County Climate Action Plan (2020)

Dane County has created a science-based plan to achieve “deep decarbonization” that is consistent with the latest recommendations from the [Intergovernmental Panel on Climate Change \(IPCC\)](#). Under the CAP Dane County aims to reduce greenhouse gas emissions (GHG) 50% county-wide by 2030 and put the county on a path to be carbon-neutral by 2050. Visit the Climate Action Plan web page [here](#).

Dane County Natural Hazard Mitigation Plan (2017; currently being updated)

The plan outlines a strategy with specific programs and policies that can be implemented by Dane County and local units of government within Dane County to reduce the impact of natural hazards on people, structures and infrastructure, and the natural environment. A wide

range of hazard mitigation projects are being considered, from small individual actions to large-scale community projects. This plan is recognized by the Federal Emergency Management Agency (FEMA) as the County’s official plan, enabling the County to apply for grants to implement projects and programs identified in the plan.

Madison Region Economic Partnership (MadREP) Advance Now 2.0 (2019)

The Advance Now 2.0 strategy represents a refreshed blueprint to ensure that the Madison Region continues its trajectory as a national community of choice. The

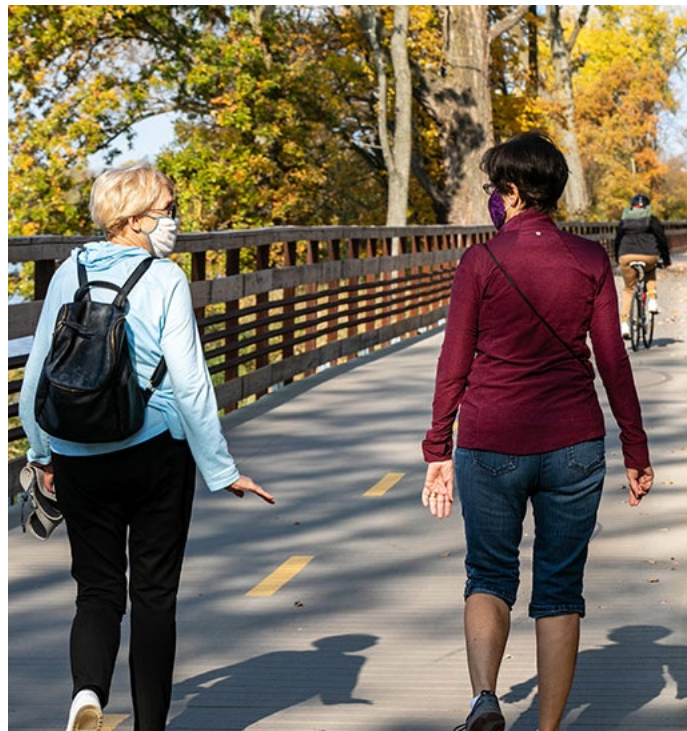
process will also serve as MadREP’s five-year update to the Comprehensive Economic Development Strategy (CEDS) process as required by the U.S. Economic Development Administration (EDA). The report notes “when asked to name the Madison Region’s top competitive issue, a surprising number of top leaders identified the need for regional transit as their number one concern.”

LOCAL PLANS

Local reports, documents, and other studies relevant to transportation, land use, and economic development in the region were also reviewed during the development of the RTP. These documents include community comprehensive plans, land use plans, corridor plans, and more.

Madison in Motion – Sustainable Madison Transportation Master Plan (2017)

Madison in Motion, the City of Madison’s Sustainable Madison Transportation Master Plan, is intended to guide future transportation decisions in Madison, in order to help make Madison a more walkable, bikeable and transit-oriented city. *Madison in Motion* builds on adopted transportation and land use plans to improve coordination, connectivity and transportation choice while establishing a framework to strengthen neighborhoods with context-appropriate future development.



What We Heard: Stakeholder Involvement and Public Outreach

The intent of the RTP is to offer a vision and blueprint for the future of the transportation network in the Madison area. To develop this vision and find consensus between competing interests, it is important to have a robust dialogue between the community, stakeholders, and local officials. The MPO staff worked to facilitate opportunities for all interested parties to participate in the planning process and attempted to make that process more inclusive for those that may not feel comfortable or have the time for traditional forms of participation. The public involvement process was broken down into three phases

- Phase One: Introduction to the Planning Process
- Phase Two: Review of Existing Conditions
- Phase Three: Presentation of the Draft Plan and Recommendations

Due to Covid-19 safety precautions, all public involvement was conducted virtually. Key public involvement activities are summarized below. In addition to the activities described below, the MPO posted RTP updates frequently through social media, in the MPO Newsletter, as well as press releases at key RTP development stages. Specific materials delivered during the involvement process can be found in Appendix E.



CONNECT GREATER MADISON RTP WEBSITE

At the start of the planning process, the MPO worked with a consultant to create an interactive website for the RTP in an effort to increase public participation and interest in the planning process. The website, greatermadisonmpo.konveio.com, provided project news, descriptions of the plan development process, a listing of RTP related boards and committees and corresponding membership, a timeline of public engagement activities and meetings, links to related plans and studies, information about the MPO, and interactive tools at

specific points in the planning process. The website also included Spanish translation of key plan information.

ONLINE SURVEY

An online public survey was launched in June of 2021 to kick off Phase One of public involvement for the RTP. The survey asked participants to rate current conditions of the transportation system, identify improvement needs, important transportation issue faction the region, and support for different policies and funding options. A total of 274 participants completed the survey, which was available in both English and Spanish. Key themes from the responses include:

- A need for greater connectivity; the region is well accessed by automobile, but responses indicated a need for expanding public transit service and additional the bike and pedestrian infrastructure.
- Prioritize maintaining and improving existing infrastructure.
- Improve safety for all users of the transportation system.
- Reduce the impact of climate change.

FOCUS GROUPS

The MPO partnered with area community organizations, including the Bayview Community Foundation, Latino Academy of Workforce Development, and Sun Prairie's Neighborhood Navigators to identify focus

group participants from demographic groups that are typically under-represented in public participation on plan development. MPO staff heard a lot about the affordability, convenience, and reliability of transportation options during these focus group discussions, including:

- The trade-off between greater accessibility by personal vehicle and the high expense of car ownership.

“My car payment is my biggest expense. Having a car for regular use means that I have to sacrifice a lot of things in the rest of my life. The money we spend to have that car so that we can have flexibility means that we do not have money to spend on other things. For example, we can’t go on trips, spend money on meals, or do fun extra activities.”

- The need for more frequent, accessible, and convenient public transit.

“The bus is not much available at night and during the weekends. [The Latino community] does not work from 9 am to 5 pm. Our community works from 4 am to 1 pm, 1 pm to 8 pm, 8 pm to 3 am and there is no public transportation to meet those different schedules.”

- Transportation barriers make it difficult to meaningfully engage with family and community.

“It is hard to be involved with kids’ after school activities and things like parent-teacher conferences due to transportation limitations.”

“I would like to be a part of the community and go to farmers markets, make trips to Madison and go to other events, but I cannot due to limited bus service.”

- Focus group participants with mobility limitations expressed challenges to accessing public transit and using sidewalk networks due to physical challenges or discomfort/lack of knowledge about options.

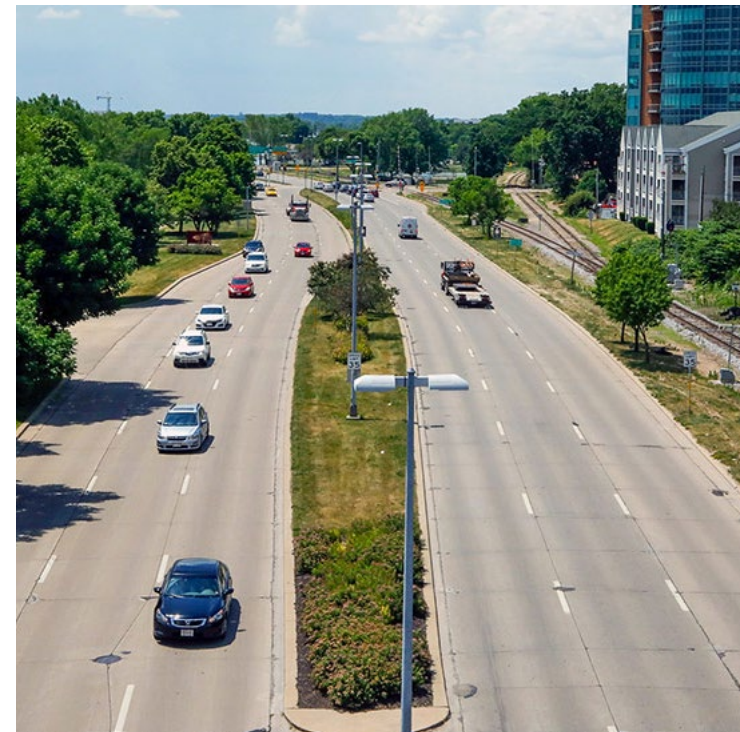
INTERACTIVE ONLINE MAPS

As part of Phase Two of public participation for the RTP update, the MPO invited the public to provide feedback through interactive maps on the existing transportation system in the greater Madison area. The interactive mapping tool allowed participants to post comments on the network, identifying specific needs, barriers, or concerns, as well as facilities that work particularly well that should be duplicated elsewhere. Over 1,300 map comments were received, identifying connectivity, safety, operational, and maintenance comments and concerns for all modes of transportation.

As part of Phase Three an interactive map including all recommended future transportation improvements was made available for public comment. The public was invited to comment on how well the proposed future transportation network would serve their needs and the needs of future growth as we work toward regional livability goals. Over 160 comments were submitted on the future network.

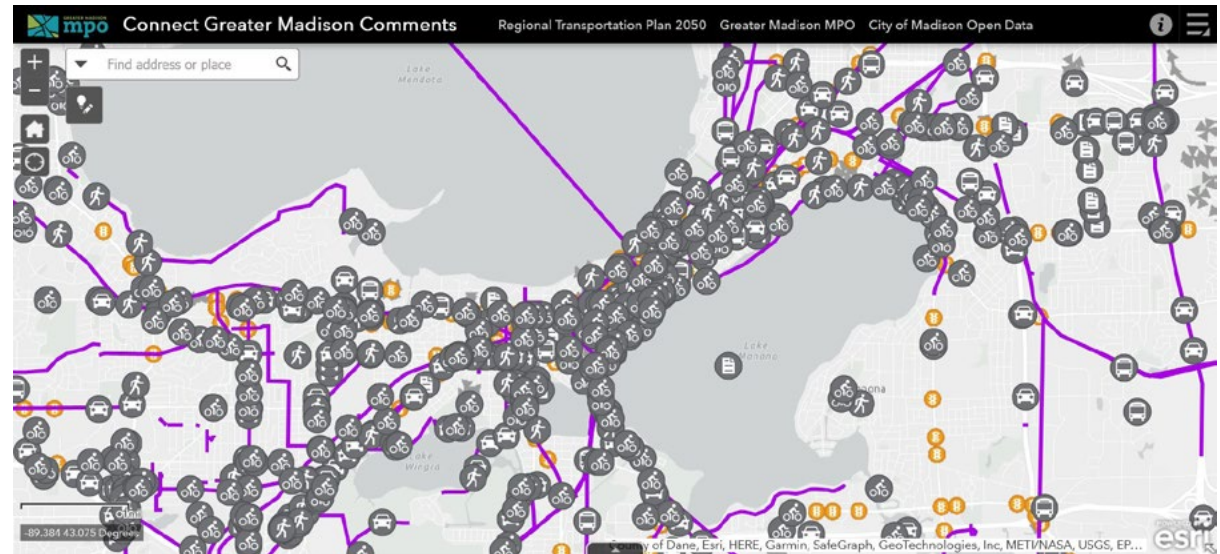
PUBLIC INVOLVEMENT MEETINGS

A series of three Public Involvement Meetings (PIMs) were held at key points in the RTP development process. The PIMs allowed MPO staff to present and illustrate information, alternatives, and plan recommendations, answer questions, and are a key method for receiving public comment. Each PIM series included a lunchtime and evening presentation. The meetings were recorded and posted on the RTP website along with all meeting materials so anyone who could not attend the live meetings could watch later. Press releases were developed to announce each PIM, notice was emailed



out to the entire MPO contact list and with a request that community organizations share the announcement with their members, and the PIMs were posted through social media.

- Phase One: Introduction to the Planning Process- June 17th and 24th, 2021
- The June 17th meeting included a joint presentation on the CARPC Regional Development Framework planning process to emphasize the regional transportation and land use planning connections.
- Phase Two: Existing Conditions- November 11th and 16, 2021
- Phase Three: Recommendations- April 7th and 12th, 2022
- Public Hearing on Draft RTP- May 11th, 2022



Screenshot of Interactive Online Comment Map



Chapter 2:

National and Regional Trends and Forecasts

National and Regional Trends and Forecasts

Introduction

National and regional trends and forecasts such as shifting demographics and growth provide insight into how best to invest in the transportation system to meet anticipated future needs while accommodating current travel demand. Demographic changes, commuting patterns, economic shifts, and land use development patterns all influence the type, location, and amount of demand on transportation facilities and services. It is particularly important to plan for these changes in the greater Madison region—the fastest growing and changing region in the state. The Madison area is outpacing the rest of the state in all key economic indicators, including job creation, business growth, and construction activity.¹ The area's population is also growing more rapidly than the rest of the state and becoming increasingly diverse. New and emerging technologies along with potential long-term impacts to travel from COVID-19, which will also have an impact on land use development and travel patterns, are discussed in Chapter 4.

¹ Connect Madison, City of Madison Economic Development Strategy (Dec. 2016).

Demographics

Demographic projections are important for determining the overall growth in travel and the transportation solutions needed to serve the growing and changing population. When coupled with commuting patterns, economic forecasts, and projected future land use development it is possible to prepare forecasts for future travel demand, identify issues and needs, and make facility and service recommendations.

POPULATION

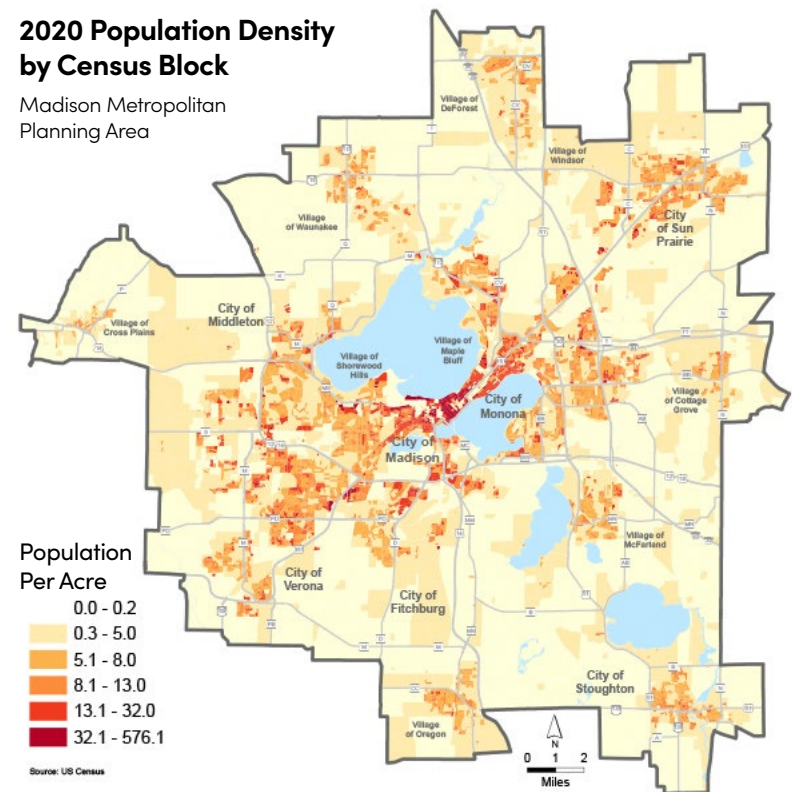
The country's population continues to grow, with a majority of this growth occurring in the southern and western states. Wisconsin is growing at a slower pace than other states due to high out-migration without comparable in-migration of either domestic or foreign-born immigrants. While Wisconsin's population grew just 4% between 2010 and 2020, Dane County's population grew by 15%, accounting for more than 1/3 of the state's total population growth.

Although the population growth rate of Dane County as a whole outpaced the City of Madison's growth from 1990–2010, Madison grew at about

the same rate as the county between 2010 and 2020, and its share of county population held steady at 48%. The most rapid rates of growth over the last decade occurred in Madison's suburban communities, which grew by about 20% collectively, led by the Village of Windsor (38%) and the City of Verona (32%). Rural areas and smaller urbanized areas in the county grew by 9% and 3%, respectively. Map 2-a shows 2020 population density by Census Block. While the greater Isthmus area has the highest

2020 Population Density by Census Block

Madison Metropolitan Planning Area



Map 2-a 2020 Population Density by Census Block

densities, there are multi-family housing developments with resulting high densities spread throughout the rest of the city of Madison and in suburban cities and villages.

Over the next three decades, Madison's outer suburbs are forecast to grow by 50%, adding 58,000 new residents, while the City of Madison and its closest suburban neighbors, are projected to grow by 36% or 124,000 residents, as shown in Figure 2-a. Population growth in smaller urbanized and rural areas

outside the Madison Metropolitan Planning Area is expected to be slower, totaling about 12,000 new residents.

HOUSEHOLDS

While the population has continued to grow nationally and within the Madison region, the average household size has declined. In 1970, the average US household size was 3.14. By 2020, the average US household size had fallen to 2.53. Here the trends have been

similar; the average Dane County household size was 3.09 in 1970 and had dropped to 2.27 by 2020. Housing and household sizes are correlated, with average house and household sizes larger in villages and towns, smaller in suburban cities, and the smallest in the City of Madison. The historic trend of shrinking household sizes is projected to continue in the future albeit at a much slower rate, with Dane County's average household size projected to decline to 2.22 by 2050, as shown in Figure 2-b.

Current and Forecast Population in Dane County Communities

Municipality	2010 Census		2020 Census		2050 Forecast		2020 - 2050 Change	
	Population	% of County	Population	% of County	Population	% of County	Number	Percent
Central Urbanized Area Total (CUSA)	298,080	61%	346,619	62%	470,960	62%	124,341	36%
City of Madison	233,209	48%	269,840	48%	362,513	48%	92,673	34%
City of Fitchburg	25,260	5%	29,609	5%	46,551	6%	16,942	57%
City of Middleton	17,442	4%	21,827	4%	29,057	4%	7,230	33%
Village of McFarland	7,808	2%	8,991	2%	13,264	2%	4,273	48%
Larger Outer Urbanized Area Total	95,395	20%	116,096	21%	174,168	23%	58,072	50%
City of Sun Prairie	29,364	6%	35,967	6%	54,028	7%	18,061	50%
City of Stoughton	12,611	3%	13,173	2%	19,621	3%	6,448	49%
City of Verona	10,619	2%	14,030	2%	20,965	3%	6,935	49%
Village of Cottage Grove	6,192	1%	7,303	1%	11,427	2%	4,124	56%
Village of Waunakee	12,097	2%	14,879	3%	23,228	3%	8,349	56%
Village of DeForest	8,936	2%	10,811	2%	16,796	2%	5,985	55%
Village of Windsor	6,345	1%	8,754	2%	11,720	2%	2,966	34%
Village of Oregon	9,231	2%	11,179	2%	16,383	2%	5,204	47%
Smaller Urbanized Areas Total	26,011	5%	28,305	5%	40,513	5%	12,208	43%
Rural Total	68,587	14%	70,484	13%	70,077	9%	-407	-1%
County Total	488,073		561,504		755,718		194,214	35%

Figure 2-a Current and Forecast Population in Dane County Communities

Household Size in Dane County Communities

	1970	1980	1990	2000	2010	2020	2050 Forecast
Towns	3.73	3.01	2.80	2.59	2.57	2.48	2.52
Villages	3.17	2.85	2.74	2.72	2.61	2.52	2.37
Small Cities	3.26	2.54	2.29	2.35	2.37	2.26	2.24
City of Madison	2.88	2.38	2.30	2.19	2.17	2.12	2.11
Dane County	3.09	2.56	2.46	2.37	2.33	2.27	2.22

Figure 2-b Household Size in Dane County Communities

Current and Future Households in the MPO area

Municipality	2010 Census		2020 Census		2050 Forecast		2020 - 2050 Change	
	Households	% of County	Households	% of County	Households	% of County	Number	Percent
Central Urbanized Area Total	130,313	64%	154,579	65%	213,314	64%	58,735	38%
City of Madison	102,516	50%	120,737	51%	165,063	50%	44,326	37%
City of Fitchburg	9,955	5%	12,612	5%	20,037	6%	7,425	59%
City of Middleton	8,037	4%	10,104	4%	13,918	4%	3,814	38%
Village of McFarland	3,079	2%	3,079	1%	5,779	2%	2,700	88%
Larger Outer Urbanized Area Total	36,967	18%	45,068	19%	74,302	22%	29,234	65%
City of Sun Prairie	11,636	6%	14,376	6%	22,924	7%	8,548	59%
City of Stoughton	5,133	3%	5,459	2%	8,652	3%	3,193	58%
City of Verona	4,223	2%	5,463	2%	9,196	3%	3,733	68%
Village of Cottage Grove	2,210	1%	2,673	1%	4,760	1%	2,087	78%
Village of Waunakee	4,344	2%	5,348	2%	9,686	3%	4,338	81%
Village of DeForest	3,400	2%	4,163	2%	7,212	2%	3,049	73%
Village of Windsor	2,432	1%	3,241	1%	4,915	1%	1,674	52%
Village of Oregon	3,589	2%	4,345	2%	6,957	2%	2,612	60%
Smaller Urbanized Areas Total	10,134	5%	11,215	5%	16,698	5%	5,483	49%
Rural Total	26,336	13%	27,555	12%	27,649	8%	94	0%
County Total	203,750		238,417		331,963		93,546	39%

Figure 2-c Current and Future Households in the MPO area

Figure 2-c details the projected change in households in Madison area communities through 2050. While the City of Madison's percentage share of households and population is projected to continue to slowly decline, it is expected to contribute over 44,000 new households within the Metropolitan Planning Area between 2016 and 2050. Of those, over 7,500 are forecast to be located within the greater Isthmus area, more than in any of the suburban communities.

Much like the rest of the state, Dane County has a large elderly population that is projected to grow in the future. The percentage of Dane county's population aged 65 and

older is expected to climb from 13% in 2020 to 20% by 2040. This population will require a transportation network that will allow for safe and convenient transportation to grocery stores and other shopping destinations, entertainment, healthcare facilities, and other destinations. It is important to ensure that our transportation system will be able to serve those who are no longer able to drive and those with disabilities.

RACE AND ETHNICITY

The United States is becoming more racially and ethnically diverse. The Pew Research Center has projected that more than 80% of population growth between 2010 and 2050 will be attributable to immigrants and their

US-born descendants. This, in combination with the comparatively low birthrate among non-Hispanic Whites, is increasing the country’s racial and ethnic diversity.

In the Madison region these trends are evident as well. Between 2010 and 2020, the overall population grew by 15% while the White population grew just 5%. This led Dane County’s non-White population to grow from 15% of the population in 2010 to 22% in 2020, as seen in Figure 2-d.

See the Environmental Justice Analysis in Appendix C for more detailed information on the distribution of the minority population within the region and an analysis related to the equitable distribution of transportation resources.

Economy

Dane County’s thriving and diverse economy has led to one of the lowest unemployment rates in Wisconsin, and to the county being a net importer of employees.

The economic strength of the region, relative to the rest of the state, is also evidenced by its surging tax base and GDP growth. According to the Wisconsin Department of Revenue, between 2014 and 2019, Dane County’s tax base grew 35%, while the state’s total tax base grew by 21%. During the same period, Dane County’s gross domestic product (GDP) grew at an annual rate of 3.5%, the eighth fastest GDP growth rate in the state and the fastest among counties with populations over 100,000.² The onset of COVID exerted a dramatic effect on the economy beginning in early 2020. While GDP returned to pre-pandemic levels by mid-2021, and much of the economy has largely recovered, employment levels remain somewhat depressed.

The highest concentration of the jobs in the MPO area is in central Madison, with other major employment clusters located along the Beltline and Interstate corridors on Madison’s periphery and at the Epic Systems main campus in Verona. Map 2-b shows employment density as of 2016.

Figure 2-e details Dane County employment by industry. The largest of these, education and health services, accounts for nearly

Race and Ethnicity of Dane County Residents

Race	Number 2010	Number 2020	Percent of Total 2010	Percent of Total 2020	Increase 2010-2020
White	413,631	435,458	85%	78%	5%
Black/African American	25,347	30,473	5%	5%	20%
Asian	23,035	35,758	5%	6%	55%
Other Minority	13,960	20,841	3%	4%	49%
Two or More Races	12,100	38,974	2%	7%	222%
Total Population	488,073	561,504	100%	100%	15%

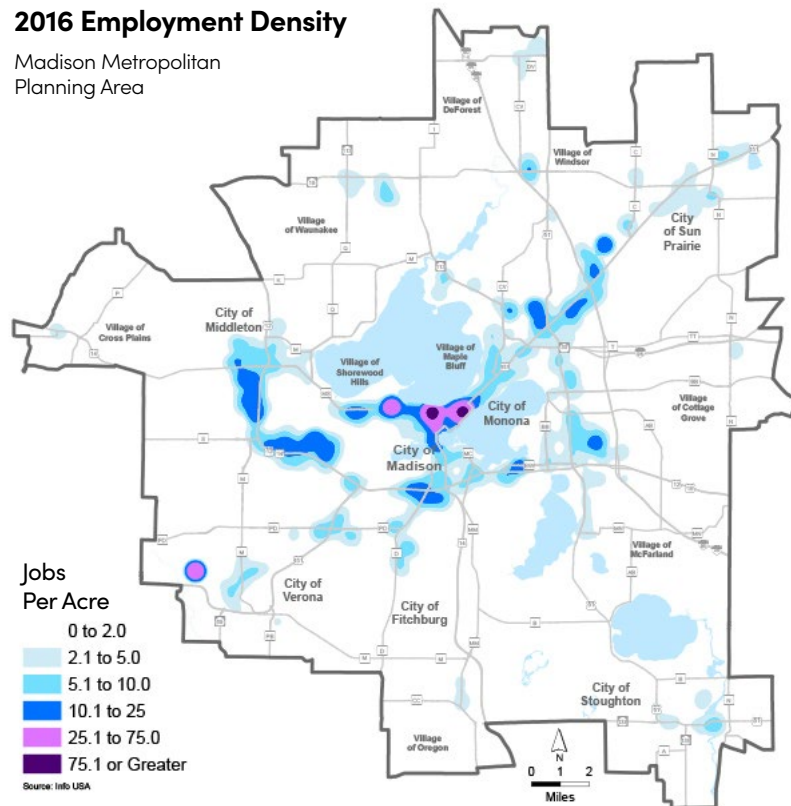
Ethnicity	Number 2010	Number 2020	Percent of Total 2010	Percent of Total 2020	Increase 2010-2020
Hispanic	28,925	41,954	6%	7%	45%
Non-Hispanic	459,148	519,550	94%	93%	13%
Total Population	488,073	561,504	100%	100%	15%

Figure 2-d Race and Ethnicity of Dane County Residents

² United States Bureau of Economic Analysis.

2016 Employment Density

Madison Metropolitan
Planning Area



Map 2-b 2016 Employment Density

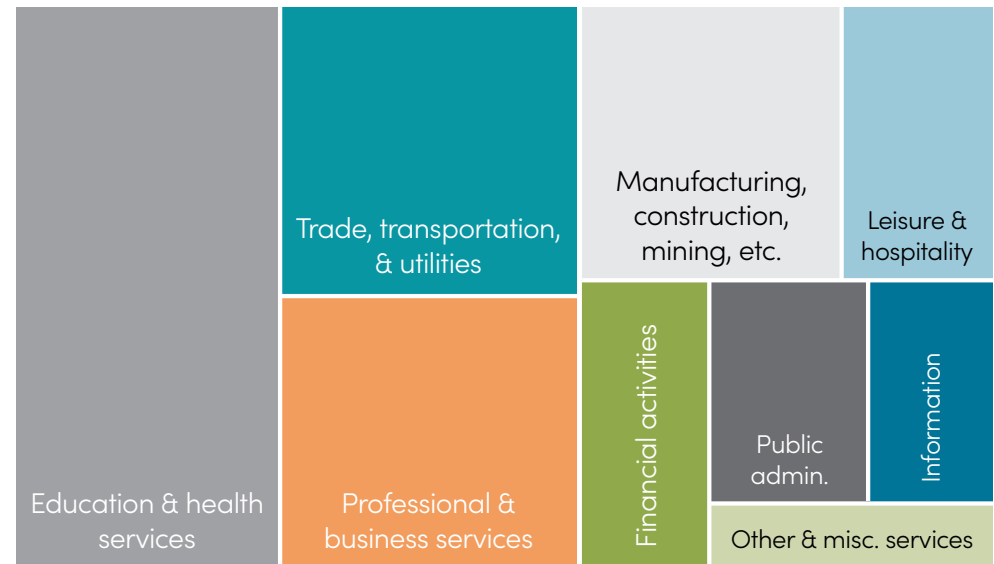
90,000 jobs, 27% of total employment, in both the public and private sectors.

Over the coming years, the Dane County economy is expected to continue its robust job growth. According to MadRep, the Madison region's economic development agency, the Madison region currently ranks 4th in the nation in its concentration of computer and mathematical occupations—behind only San Jose, Washington, D.C., and Seattle. MadRep forecasts that employment in this sector,

is expected to increase by more than 50% between 2010 and 2030. A number of other occupations in the areas of science, engineering, personal care, food service, and business, are expected to grow by at least 25% during this period.

According to pre-COVID US Census data estimates, around 50,000 workers traveled into Dane County per day from surrounding counties, and about 15,000 traveled from Dane County to surrounding counties for work. In the coming years, Dane County's

Dane County Annual Average Employment by Industry, 2020



Source: US BLS, QCEW

Figure 2-e Dane County Employment by Industry

along with construction and extraction occupations, and healthcare practitioners and technical occupations,

surplus of jobs relative to workers is expected to continue growing.

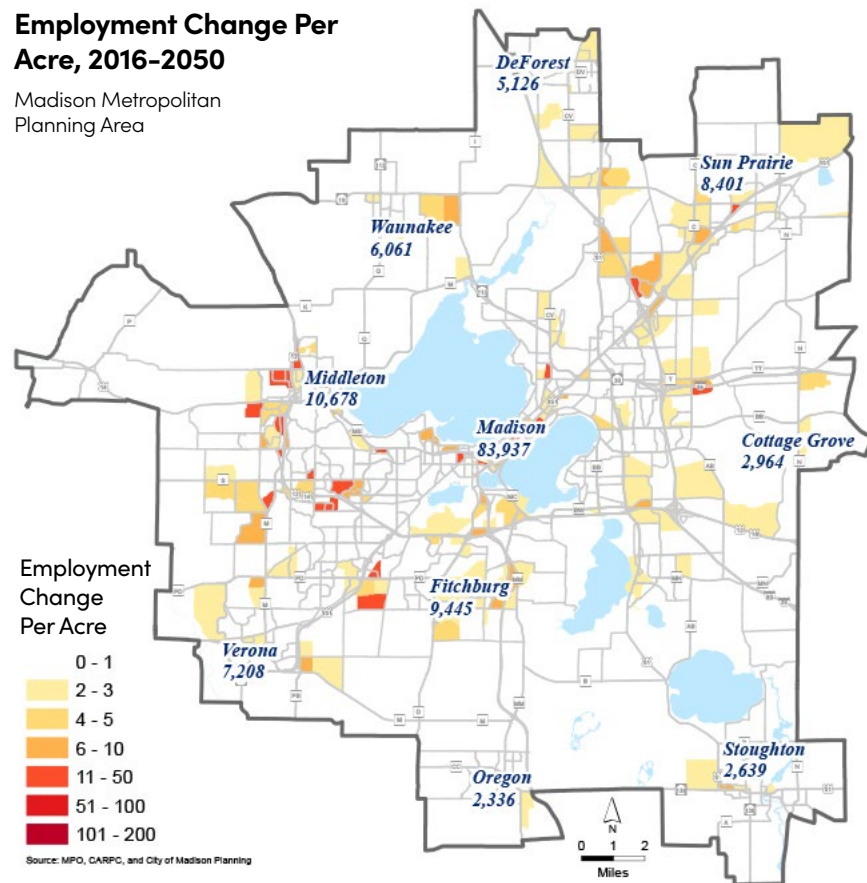
Map 2-c illustrates the forecast employment growth areas. While the City of Madison's share of employment is forecast to decline somewhat, total employment within the city is projected to grow by nearly 84,000 between 2016 and 2050, accounting for over 50% of new employment within the Metropolitan Planning Area.

Land Use and Development

Land use and transportation are inextricably linked. The mix, location, and density of land uses drive travel demand; interacting with one another to determine the cost

Employment Change Per Acre, 2016-2050

Madison Metropolitan Planning Area



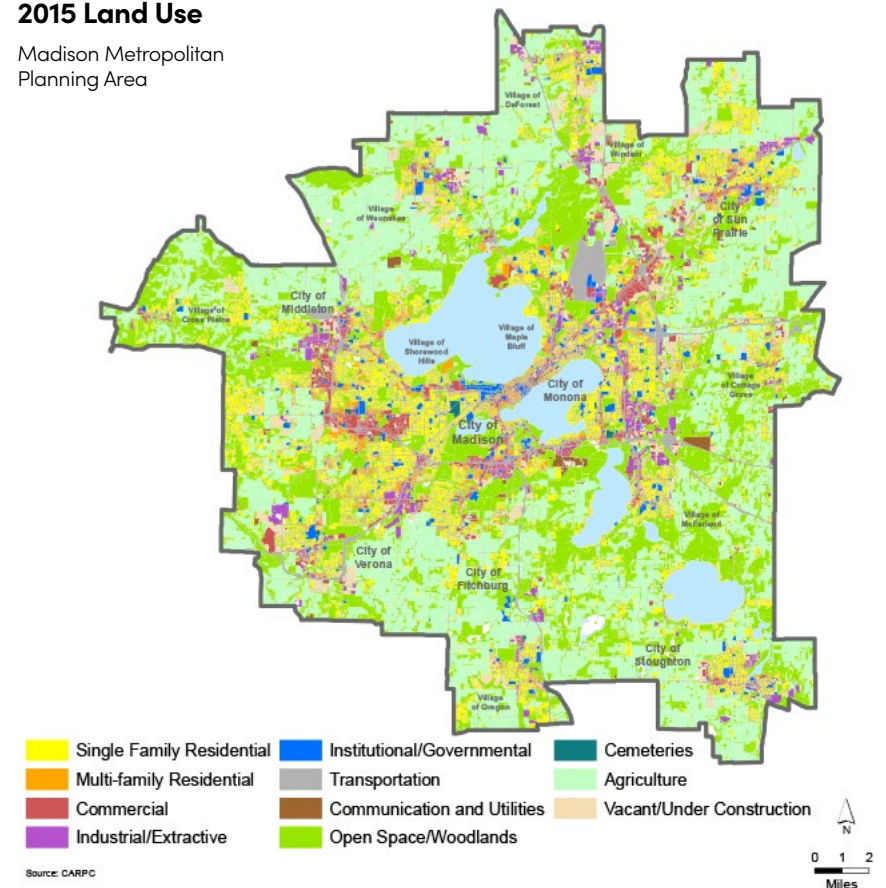
Map 2-c Employment Change per Acre 2016-2050

of transportation, viability of different transportation modes and investments, and ability of travelers to combine modes to complete trips. Transportation investments, in turn, affect the attractiveness of locations to residents and businesses and shape future land use development decisions.

Map 2-d shows the location of land uses in 2015 in the Madison Metropolitan Planning

2015 Land Use

Madison Metropolitan Planning Area



Map 2-d 2015 Land Use

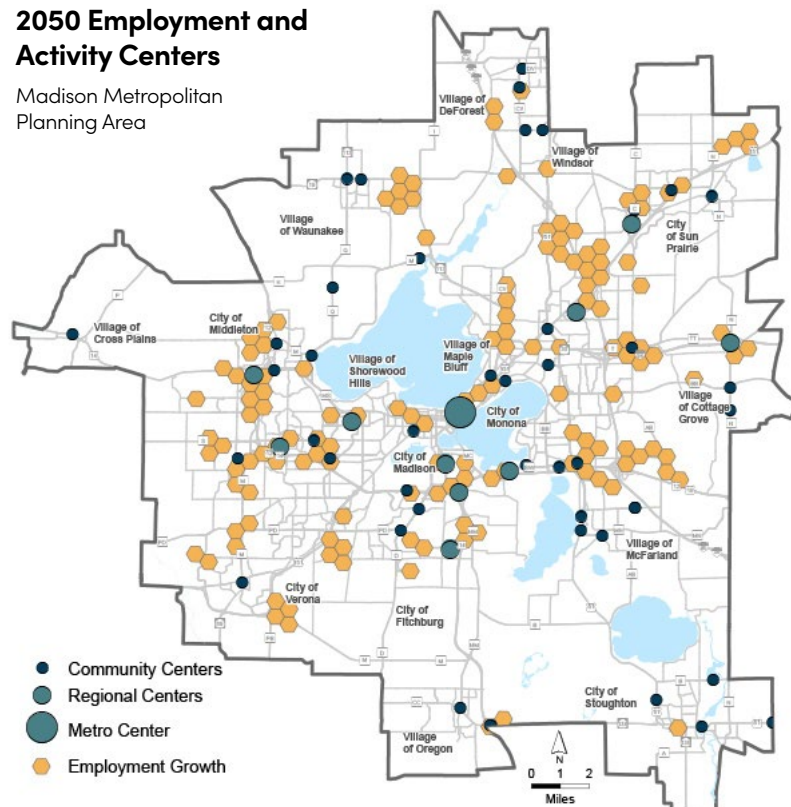
area. Multi-family residential, commercial, and institutional/governmental uses tend to be concentrated in central Madison and along major transportation corridors throughout the area. Retail sales/services and industrial uses, which depend on freight accessibility, cluster in areas with easy access to major roadways. Single-family homes occupy much of the rest of the developed

area, close enough to access jobs and services but usually far enough to reduce the noise and traffic impacts of more intense land uses.

A number of urban planning models have been developed to determine how land use, transportation facilities, and density interact. One prominent contemporary model, the Rural-to-Urban Transect, suggests that

2050 Employment and Activity Centers

Madison Metropolitan Planning Area



Map 2-e 2050 Employment and Activity Centers

urbanism occurs in symbiotic transects. The Transect describes levels of urbanization that range from a natural rural preserve to a dense urban core. Each of these typologies is symbolic of different development patterns and requires different transportation facilities. One of the benefits of this model is that it demonstrates the similarity between zones that may not appear to be similar, but have similar characteristics and require similar transportation treatments.

For instance, the Madison neighborhood of Hill Farms near University Avenue has similar transportation needs to that of the Schenk-Atwood-Starkweather-Yahara (SASY) neighborhood. Though the densest portion of Hill Farms would be viewed as a contemporary, transit-oriented development and SASY is an older neighborhood built around a defunct streetcar line, both require high-quality transit service, quality pedestrian and bicycle facilities, and regional transportation for moving residents, workers, shoppers, and freight. The Transect would identify them both as “urban center” zones that require similar facilities.

In the past, communities generally hewed to a centralized development pattern—an urban core buoyed a community, with urbanity transitioning into suburban and rural forms gradually as one moves away from the core. This configuration encourages driving in the periphery and forces traffic into one dense core. Contemporary configurations retrofit dense activity centers into areas that have been traditionally home to suburban or general urban development, or build them as part of new developments. This increases

pedestrian and bicycle activity, while making transit more viable in these mixed-use activity centers. The encouragement of development of high-density, mixed-use activity centers, primarily along existing and planned major transit corridors is a central recommendation of the Capital Area Regional Planning Commission’s 2050 Regional Development Framework, the City of Madison’s Madison in Motion Transportation Plan, and this RTP. Map 2-e details planned employment and activity centers in 2050.

Travel Patterns

While the primary source of information about travel patterns has traditionally been provided by the US Census—which provides information only on travel to and from work, the MPO obtained local household travel survey data covering trips of all types for the RTP. The MPO conducted a household travel survey in conjunction with the National Household Travel Survey (NHTS) in 2016–2017, to gather additional household data in the Madison area, especially from minority and low-income households that are often under-represented in travel survey data, and to generate sufficient numbers of trips by alternative travel modes. This combined travel survey data provided a wealth of information about the travel habits of people in the Madison area, and was used to develop an updated and improved regional travel forecast model. The following are some general observations from the survey:

- Trips made by residents of the central Madison area (see Map 2-f) tend to be much shorter, for all trip purposes and modes, than trips made by residents of suburban communities. Trips made by residents of other parts of the City of Madison tend to be in the middle range in terms of distance.
- Commute trips, those between home and work, tend to be longer than other types of trips.
- Suburban residents' bicycle trips are more often between home and school, and less often for social-recreational or other trip purposes, than people living elsewhere. Residents of the central Madison area tend to bicycle for a wider variety of trip purposes compared to residents of other areas.
- Residents of the central Madison area are two to three times more likely to make trips by bike, walking, or transit than are people living in other areas.
- Respondents with annual household incomes below \$35,000 are much more likely to make trips by foot, bike, and bus.
- Minority respondents report traveling by bike and bus at about twice the rate of White respondents.
- The vast majority of car trips between home and work are made by drivers traveling alone, while more than half of other car trips to and from home involve drivers transporting at least one other person.

As shown in Figure 2-f, the percentage of trips made by bike, bus, and foot is far higher in the central Madison area, and declines for those living in other parts of Madison, and in other MPO communities. Single-occupant (SOV) and multiple-occupant (HOV) trips made by personal motor vehicles show the reverse pattern.

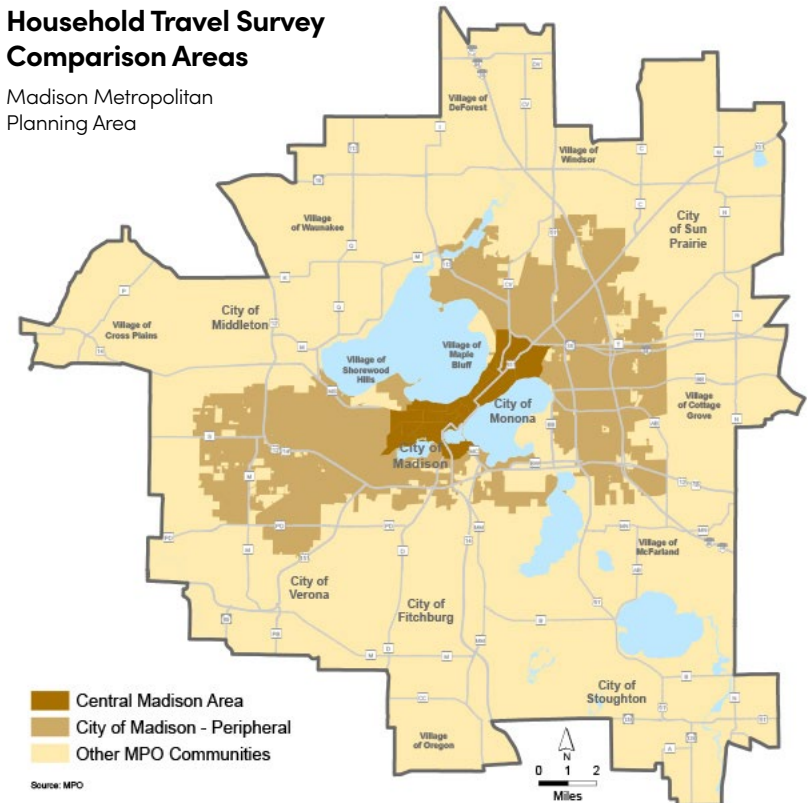
These disparities in travel habits by area are due in large part to the different development densities and design in different parts of the region. In the central area, residences, jobs, and services are closer together and buildings are oriented to the street, enabling residents in these areas to travel more easily by non-auto modes.

Access to vehicles is also a critical factor in how people travel to and from work. As shown in Figure 2-g, 10% of Dane County households have more workers than motor vehicles.

Unsurprisingly, travel time to work tends to be shortest in Madison and longer in more peripheral areas of Dane County. As shown in Figure 2-h, about 80% of Madison residents can travel from their home to their workplace in 30 minutes or less, compared to 75% of residents of other MPO communities, and 60%

Household Travel Survey Comparison Areas

Madison Metropolitan Planning Area

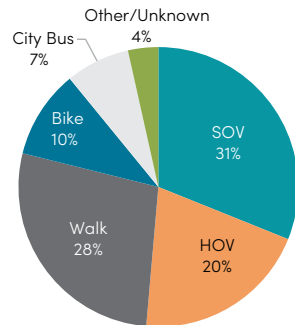


Map 2-f Household Travel Survey Comparison Areas

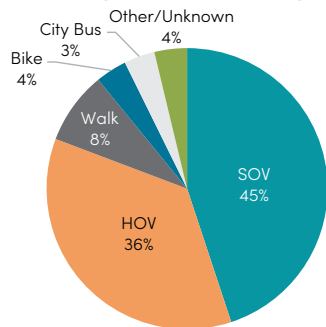
of Dane County residents living outside the MPO area. These percentages are virtually identical when restricted to travel by car, truck, or van. Commute trips by public transit exhibit a similar pattern with those made by City of Madison residents generally shorter than those by residents of other MPO area communities, see Figure 2-i.

As shown in Figure 2-j, walk trips to work exhibit the opposite pattern, with City of Madison residents making longer commutes

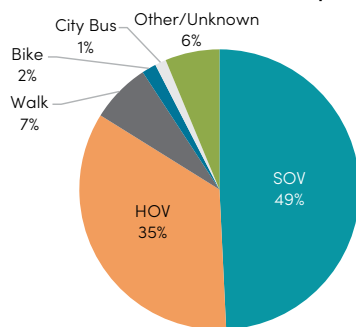
Central Madison Area Trips by Mode



Peripheral City of Madison Trips by Mode



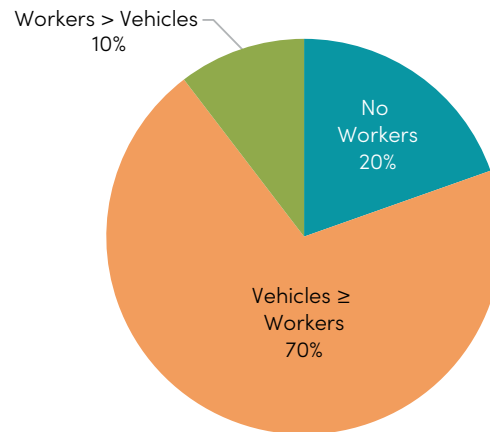
Other MPO Communities Trips by Mode



Weekdays; excludes loop trips and trips to/from outside Dane County.

Figure 2-f Trips by Mode by Area

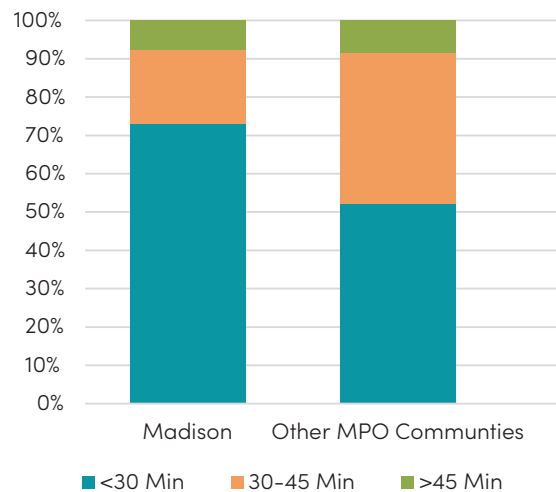
Household Vehicle Availability



Source: ACS 2019 5 yr est.

Figure 2-g Household Vehicle Availability by Worker

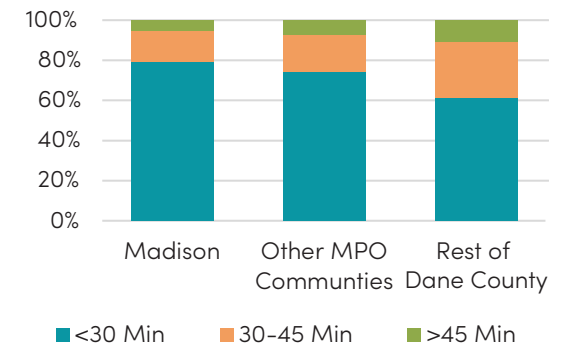
Travel Time to Work: Public Transportation



2019 5-yr estimate, American Community Survey

Figure 2-i Travel Time to Work: Public Transit

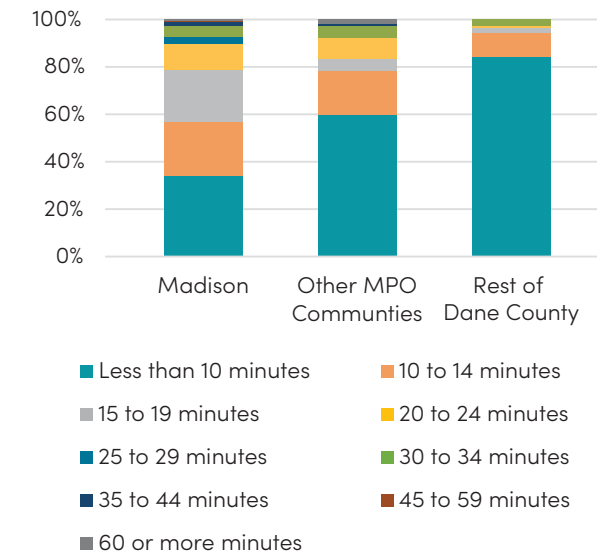
Travel Time to Work: All Modes



2019 5-yr estimate, American Community Survey

Figure 2-h Travel Time to Work: All Modes

Travel Time to Work: Walk



2019 5-yr estimate, American Community Survey

Figure 2-j Travel Time to Work: Walk

by foot than residents of other parts of the MPO area or the rest of the County, outside of the MPO area. This is likely due to the wealth of pedestrian infrastructure throughout the city, which makes walking more enjoyable. However, whether in the City, other MPO area communities, or in the rest of the County, over 90% of walk trips to work are less than 30 minutes in duration, and a majority are less than 15 minutes.

Historically, the Madison area has had two periods of peak weekday congestion coinciding with commuters’ trips to and from work—roughly 7:00–8:15 a.m. and 3:45–5:00 p.m. The COVID pandemic, and the resulting rise in telework and other changes to work and travel habits, has dramatically changed this long-standing pattern. As Figure 2-k shows, congestion (shown in shades of orange) during the AM peak period virtually disappeared in 2020 while PM peak period congestion remained.

In the Madison area, the most concentrated area of employment is in the downtown

Madison/UW-Madison campus area; however, over the last few decades most of the new employment growth has occurred in peripheral Madison and suburban job centers. As a result, travel patterns are becoming more disbursed throughout the region.

Over the last decade, a number of new apartment buildings have been constructed in downtown Madison and on the Isthmus. These new buildings have attracted a residential population of young professionals. While many of these new residents move downtown to be closer to work, others do so to live a more urban lifestyle while working in peripheral areas. Because most commuters travel from peripheral areas to centrally located jobs, the opposite is known as “reverse commuting.”

One popular reverse commute is between downtown Madison and the Epic Systems campus on the western edge of the City of Verona. In 2012, Epic employed more than 6,200 employees. Understanding that many

Epic employees were commuting from Madison to Verona, Metro Transit, the City of Verona, and Epic worked to add two new bus routes – one connecting the campus to downtown Madison and the other connecting to the West Transfer point. As of 2019, Epic had grown to more than 10,000 employees.

Dane County is a net importer of workers due to having a surplus of jobs and stronger economy than surrounding counties. Map 2-g shows 2017 county-to-county average daily commuter flows. Columbia and Rock Counties each supplied Dane County with over 11,000 workers per day, with every other adjacent county supplying at least 4,000. More than 2,000 workers per day left Dane County for jobs in Rock, Columbia, Sauk, and Jefferson Counties.

As the major employment hub, the City of Madison experiences a large influx of workers from other communities within the county as well as from outside the county. It is estimated that about 67,000 workers commuted to the City from other communities

in Dane County in 2017. Map 2-h shows the percentage of residents within each community that commuted to the City of Madison for work. Communities with the highest percentage of their workers commuting to Madison include: the Village of Shorewood Hills (64%); the Village of Maple Bluff (63%); the Town of Madison

Hours of Congestion 2020

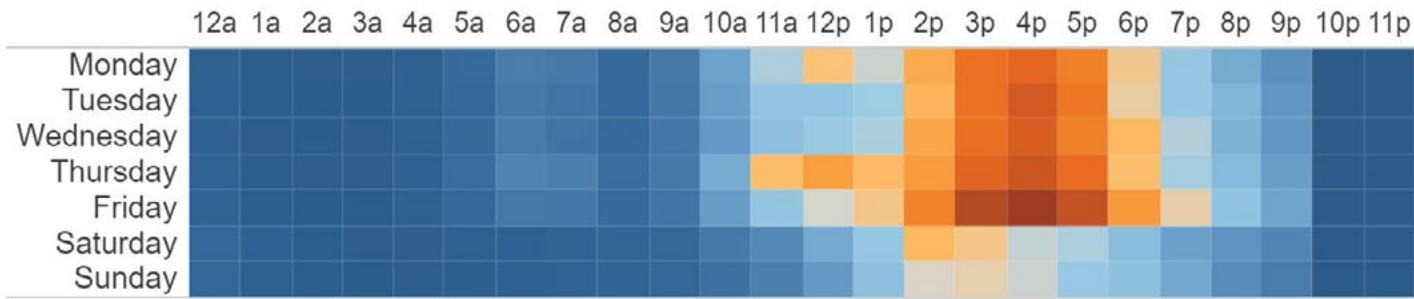
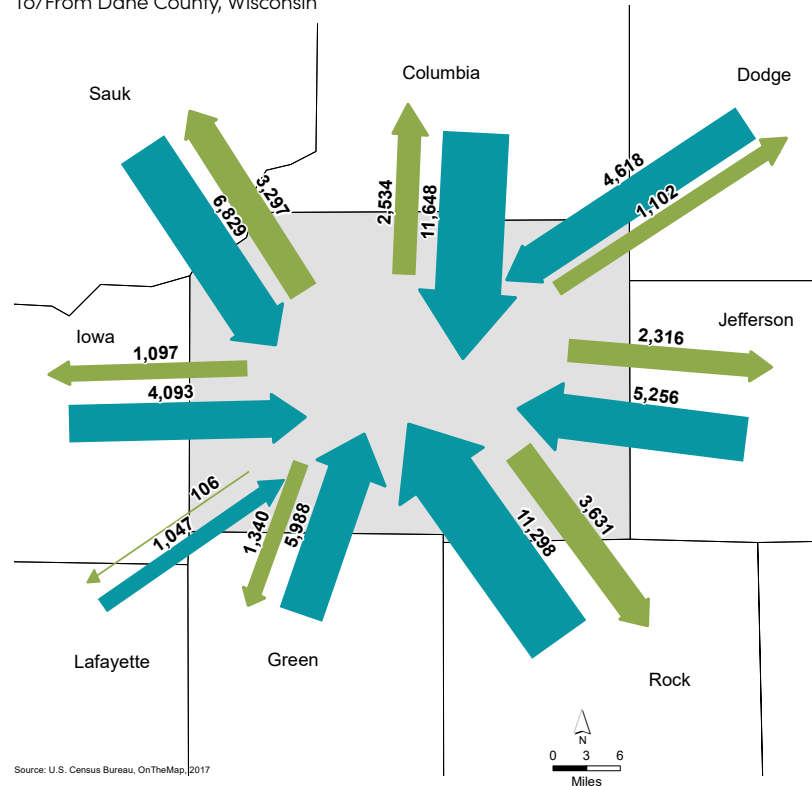


Figure 2-k Hours of Congestion 2020

County to County Commuter Flows

To/From Dane County, Wisconsin



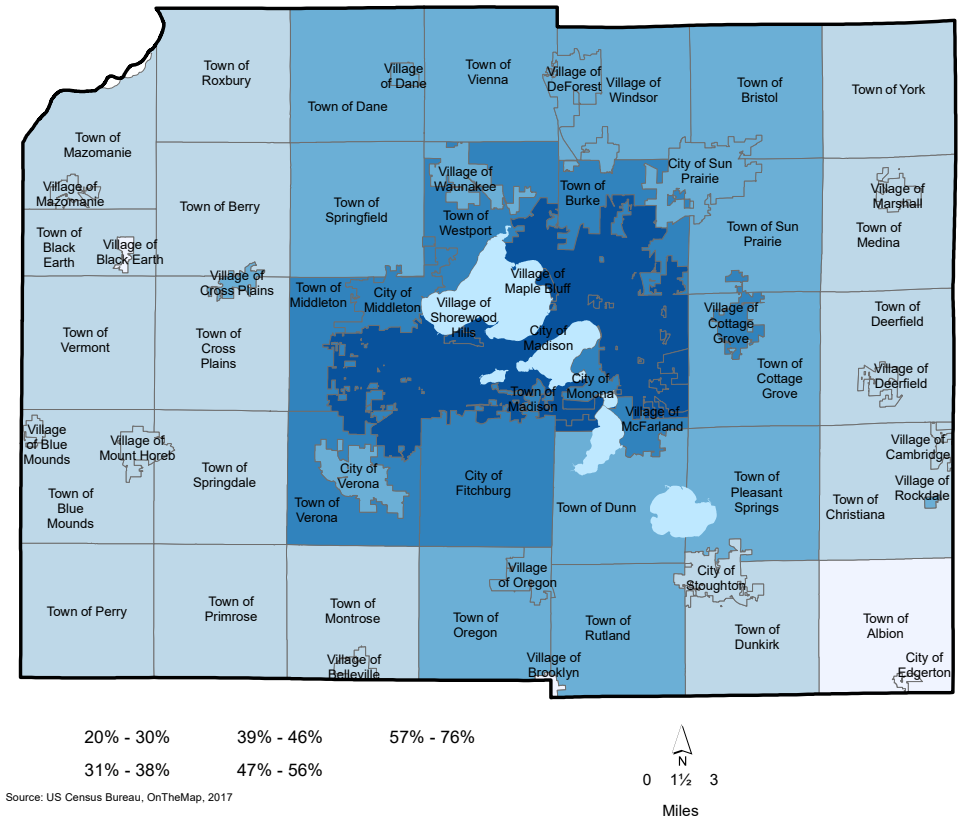
Map 2-g County to County Commuter Flows

(56%); the City of Monona (54%); the City of Middleton, and the City of Fitchburg (50%). 75,000 people both live and work in the City of Madison, 58% of all workers living in the City. With the increase in teleworking as a result of the pandemic, there are likely fewer commuters traveling into the county and city for work on a daily basis now. However, the trend of increasing numbers of commuters traveling into the county for work is expected to continue in the future.

One way that agency and community partners in the Madison region mitigate the impact of commuting is through the RoundTrip transportation demand management (TDM) program managed by the MPO. RoundTrip provides information and services for commuters and employers in Dane County to promote alternatives to driving alone. RoundTrip also works closely

Percentage of Workers Commuting into the City of Madison

Dane County, Wisconsin



Map 2-h Percentage of Dane County Workers Commuting into the City of Madison

with Rideshare Etc., the TDM program managed by WisDOT, which serves employers and workers in other parts of Wisconsin, including Dane County residents working elsewhere in the state. For more information on the RoundTrip program and TDM in the Madison region, see chapters 3 and 4.



Chapter 3:

Our Transportation System Today

Our Transportation System Today

The following sections describe the existing conditions of the greater Madison region transportation system. To view the region's progress towards achieving the adopted targets of the federally required transportation performance measures please see Appendix B.



Roadways

Streets and highways form the foundation of the transportation system. Aside from limited-access freeways, roadways must be designed to accommodate safe, convenient travel by buses, bicyclists, and pedestrians, as well as motorists. In addition to travel, streets play a role in public life and the way we experience cities. As the National Association of City Transportation Officials (NACTO) notes, they are the lifeblood of our communities and the foundation of our urban economies. With streets making up 80% of all public space in cities, they have the potential to foster economic activity, serve as an attractive front yard space for residents, and provide a safe place for all people, including those moving on foot, by bike or via transit.

There are over 2,900 miles of public roadways in the MPO Planning Area and 380 bridges. Roads are critical to virtually all freight moving to and from locations in Dane County. In 2019, 98% of Dane County's

freight tonnage and 90% of its freight value moved exclusively by truck. The remainder, which moves by other modes for part of its trip, needs to travel by truck on the first or last legs of its journey. Countywide in 2019, the roadway system carried an estimated 14.4 million vehicle miles of travel each day. Roadways also have both direct and indirect impacts on the natural environment that must be considered in planning efforts and facility design.

Streets and highways provide connectivity to jobs, homes, shops, parks, and other opportunities. The physical design characteristics of each roadway play a significant role in its safety, operational performance, and ability to accommodate different transportation modes. As an infrastructure asset, the roadway system requires maintenance to remain in acceptable condition.

The Madison area has a uniquely constrained roadway system due to the natural geography of the area, with the City of Madison's downtown sitting on an isthmus. The City of Madison, founded in 1848, is a master planned community built on a tight grid of streets around what we now know as the Capitol Square. High-volume arterial streets radiate from the square and connect to a number of State and Interstate Highways, including the Beltline (U.S. Highways (USH) 12, 14, 18, and 151), Stoughton Road (USH 51), and I-39/90/94. Unlike many urban areas, downtown Madison is located off the freeway and expressway network. This has greatly

contributed to the livability of the downtown, but also made traffic circulation more challenging, increasing the importance of travel demand management and operational strategies for mitigating congestion. Many suburban communities surrounding Madison were founded in the late 1800s, and contain a similarly dense street grid in their historic cores.

Roadway development patterns changed across the United States after World War II. America built most of its early highway and freeway infrastructure during this time, leading to the rise of suburbanization. Terms like roadway hierarchy became part of the planning lexicon, and curvilinear streets and cul-de-sacs became the norm for new neighborhood design. The Madison area was no exception to national trends. The construction of the Beltline Highway facilitated growth in areas further from the urban core, including the suburbs. Conceived and approved in 1944, the Beltline opened as a 2-lane highway in 1949.

In the 1950s, intersections with the Beltline were steadily converted into interchanges and portions of the road widened to four lanes. In the 1970s, portions of the roadway were expanded to six lanes. In 2022, WisDOT will complete work on the Flex Lane project on the Beltline, which will allow peak-period use of the Beltline Highway's interior shoulders, thereby providing an extra travel lane in each direction.

The COVID-19 pandemic has changed driving behavior. Prior to the pandemic, travel

demand during the AM and PM peak periods was significantly higher than midday travel. With the increase in telework, those peaks have flattened somewhat, especially the AM peak with traffic now distributed more evenly throughout the day. The reduced peak traffic volumes as a result of increased teleworking could help to reduce the need for capacity expansion in the future.

ROADWAY FUNCTIONAL CLASSIFICATION SYSTEM

The Federal-Aid Highway Act of 1973, as amended, requires the use of a functional highway classification to update and modify the Federal-aid highway system. Functional classification defines the role the roadway plays (mobility, connectivity, accessibility) in serving motor vehicle travel needs through the regional roadway network. Functional classification carries with it some expectations about roadway design, including its speed, capacity and relationship to existing and future land use development. However, the land use context for roadways and the priority and needs for transit, bicyclists, and pedestrians must also be considered in designing roadways and their operations.

The Federal Functional Classification system divides roadways into two groups – urban and rural – based upon whether or not the roadway is located within the urban area boundary of a metropolitan area. The system classifies roadways into the following main categories:

- **Principal Arterials**, which include the Interstate, other access restricted freeways and expressways, and other high traffic volume roadways serving the longest trips and the major regional centers and facilities;
- **Minor Arterials**, which connect and augment the principal arterials, serve moderate distance trips and community land uses;
- **Collectors**, which connect neighborhoods to the arterials, serving more of an access function and shorter trips connecting to neighborhood facilities; and
- **Local Roads**, which serve primarily an access function for homes and businesses.

Federal legislation uses functional classification in determining eligibility for funding under the Federal-aid program. All roadways classified as a rural major or urban collector or higher are eligible for federal funding.

The MPO coordinates with WisDOT to assign functional classifications to roadways in the urban area, while WisDOT assigns functional classes to roadways in the rural area. Roadways are classified according to average daily traffic (ADT) volume, population of the area, land uses served, spacing criteria, and supplemental criteria (e.g., whether bus or truck route and traffic control). In addition, rural-urban interface is considered, which ensures the connectivity of routes from rural areas into urban areas.

Map 3-a shows the functionally classified roadway system in Dane County as approved in 2015. The map is updated every ten years.

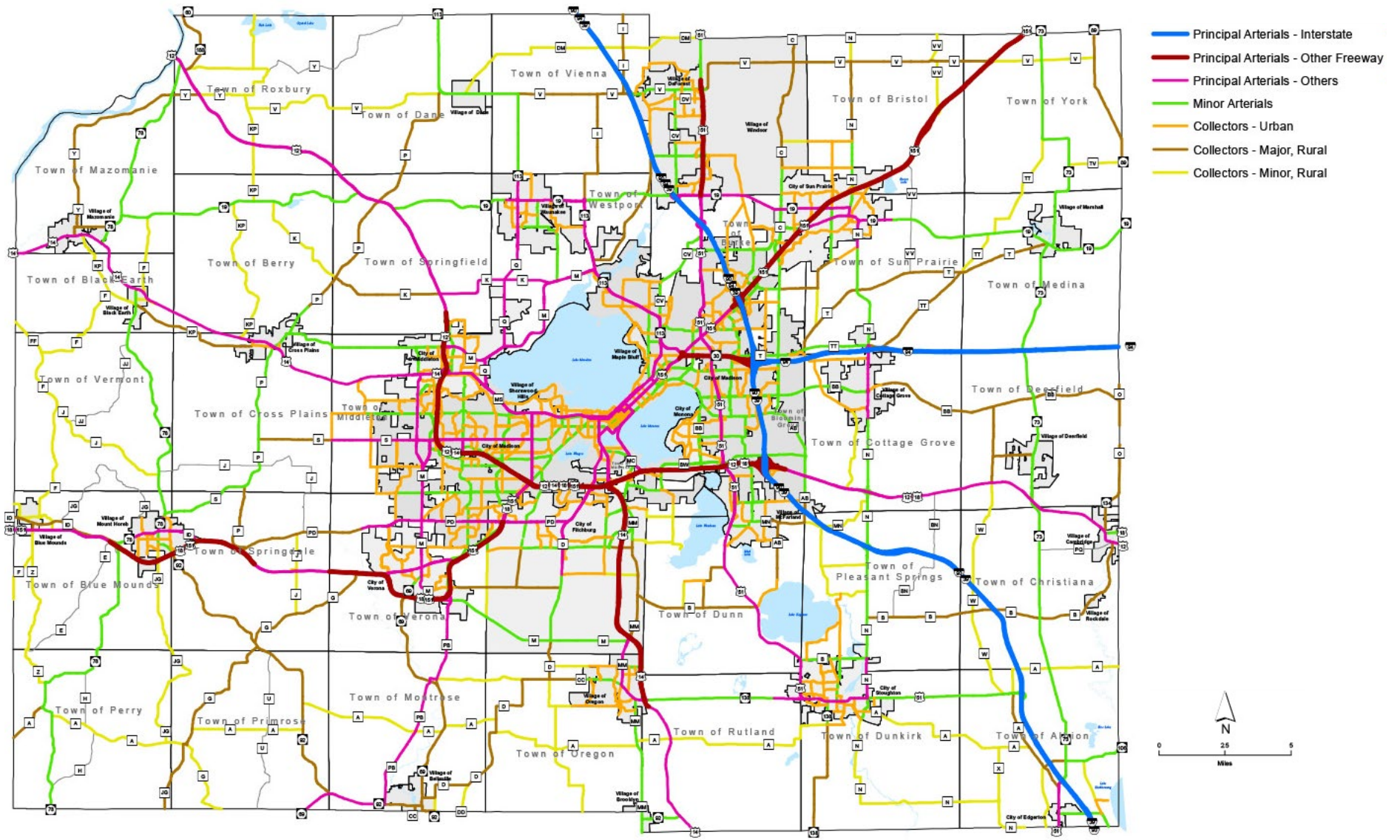
STREET TYPOLOGY

The functional classification system only addresses how roadways are being used by motor vehicle traffic. Street typology goes beyond that to look at land use and community context and considers multi-modal travel. In 2021, the City of Madison hired a consultant to assist the city in developing a process and tools to assist in designing new and reconstructed streets that balance all competing street uses consistent



Roadway Functional Classification System (2020)

Dane County, Wisconsin



Map 3-a 2020 Roadway Functional Classification System (2020)

with its Complete Green Streets policy. The policy is based on putting people first, supporting community, fostering sustainability, and achieving equity. A draft street typology was developed, which classifies streets by the land use context, target speeds, and equity issues and relates those to functional class. The project also includes identifying a modal (transit, bike, auto) priority network as a tool for balancing needs when (re) designing streets. For more information, see the project website at this link: <https://www.cityofmadison.com/transportation/initiatives/complete-green-streets>.



NATIONAL HIGHWAY SYSTEM

The National Highway System consists of roadways important to the nation's economy, defense, and mobility. The NHS was developed by the Department of Transportation (DOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs).

The National Highway System (NHS) includes the following subsystems of roadways:

- **Interstate**
- **Other Principal Arterials**
- **Strategic Highway Network (STRAHNET)**, which includes highways important to the United States' strategic defense, providing access, continuity and emergency capabilities for defense purposes.
- **Intermodal Connectors**, which provide access between major intermodal facilities and the other subsystems making up the NHS.

The MPO Planning Area contains a total of 158 NHS Interstate Highway lane miles, 463 non-Interstate NHS US/State highway lane miles, and 88 local road NHS lane miles. The National Highway System is shown in Map 3-b.

ROADWAY JURISDICTION

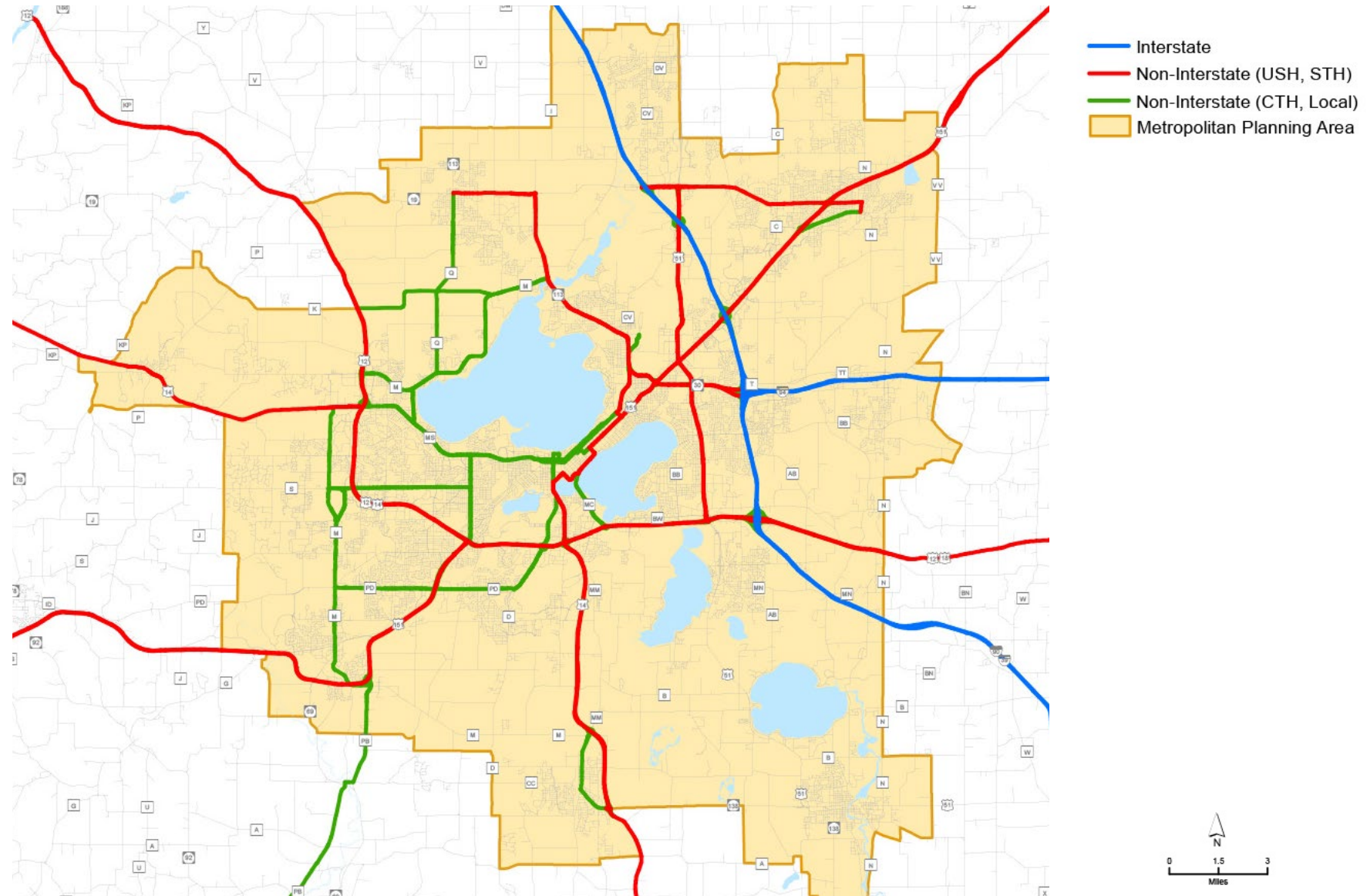
Roadway jurisdiction indicates which agency or community owns the road and is responsible for construction, maintenance, and operations. Roadway jurisdiction of the regional roadway network, including

all arterials and collectors, is generally categorized in the following systems:

- **State Highway System:** The state highway system consists of all highways under the jurisdiction of the Wisconsin Department of Transportation (WisDOT), including Interstate highways, U.S. Highways, and all other state highways, referred to as State Trunk Highways. 36% of the regional roadway system centerline miles are under WisDOT jurisdiction.
- **Connecting Highway System:** Connecting highways are technically local roads that run through developed portions of cities and villages and connect to and are signed as state highways. The state maintains responsibility for their reconstruction, when needed, but ongoing maintenance is the responsibility of the municipality. Municipalities receive connecting highway aids to offset this maintenance cost. 1% of the regional roadway network are connecting highways, including East Washington Ave., Northport Dr. and Packers Ave., and S. Park Street.
- **County Trunk Highway System:** The county trunk highway system contains public roads under the jurisdiction of and maintained by Dane County. 29% of the regional roadway system centerline miles are under Dane County jurisdiction. That percentage has been decreasing as segments of county highways in cities and villages have been transferred to the

National Highway System 2020

Madison Metropolitan Area



Map 3-b National Highway System 2020

municipality following reconstruction per agreement with the county.

- **Municipal Street System:** The municipal street system includes public roads and streets within the limits of municipalities, except those on the federal, state, and county systems and connecting highways. 34% of the regional roadway system centerline miles are under the jurisdiction of local municipalities.

In some instances, an entity with roadway jurisdiction may enter into an agreement to have another agency perform maintenance, manage operations, or provide snow removal services; however, the agency with jurisdiction over the roadway is ultimately responsible for ensuring the maintenance is performed in a satisfactory manner. For example, Dane County performs all snow removal on the Beltline and Interstate per contract with the state, which are both under WisDOT jurisdiction.

PAVEMENT CONDITION

The useful life of a roadway can be extended, and costs can be minimized, by implementing appropriate preservation treatments throughout the pavement’s lifecycle. Selecting the right pavement preservation treatments requires understanding current pavement conditions and where the roadway is in its lifecycle. There are three primary measures used to evaluate pavements in Wisconsin: the Pavement Surface Evaluation and Rating (PASER) system, the Pavement

PASER Ratings and Corresponding Treatments

Quality	Rating	Treatment for Pavement	Treatment for Concrete
Excellent	9-10	No maintenance required	No maintenance required
Good	7-8	Crack sealing and minor patching	Routine maintenance
Fair	5-6	Preservation treatments (non-structural)	Surface repairs, partial-depth patching
Poor	3-4	Structural renewal (overlay)	Extensive slab or joint rehabilitation
Very Poor	1-2	Reconstruction	Reconstruction

Figure 3-a PASER Ratings and Corresponding Treatments

Condition Index (PCI), and the federal measure, required under the federal surface transportation program.

The Pavement Surface Evaluation and Rating (PASER) system is used to assist local communities in evaluating the condition of municipal roadways. The PASER rating system was developed by researchers at the University of Wisconsin-Madison to be a quick, comparable way to evaluate surface conditions of pavement. The system rates pavements along a scale from 1-10 and prescribes treatment options accordingly, as shown in Figure 3-a.

For state roadways, WisDOT uses the more sophisticated Pavement Condition Index (PCI) to evaluate pavement condition. PCI was developed by the United States Army Corps of Engineers, and uses a visual survey to measure the distress of pavement. This widely utilized method of pavement condition measurement factors in twenty different pavement distress types (e.g., different cracking types, rutting, potholes, etc.).

In addition to these pavement distress types, PCI rates distress in jointed concrete pavements. The system rates pavements



along a scale of 0-100 in which 0 is the worst possible roadway condition and 100 is a new roadway. For simplicity, this scale has been converted to the PASER scale where used in the RTP. Map 3-c details pavement condition in the MPO planning area.

Generally, roadways with a pavement condition of “fair” or worse are nearing the end of their repairable life. Lower volume roads routinely fall into this category, while high-volume, regional mobility corridors rarely do. In 2019/2020, pavement condition in the MPO Planning area varied by facility type:

- 100% of the Interstate highway system was in good to excellent condition
- 87% of the US highway system was in good to excellent condition
- 90% of the state highway system was in good to excellent condition
- 58% of county and municipal arterial and collector roads were in good to excellent condition.

Some of the regional roadways in the poorest condition in 2019 include:

- State Trunk Highway (STH) 113 from Kennedy Road to the STH 19 (very poor to fair) – *Pavement replacement scheduled for 2023*
- STH 113 north of STH 19 (very poor to fair) – *Pavement replacement scheduled for 2024*

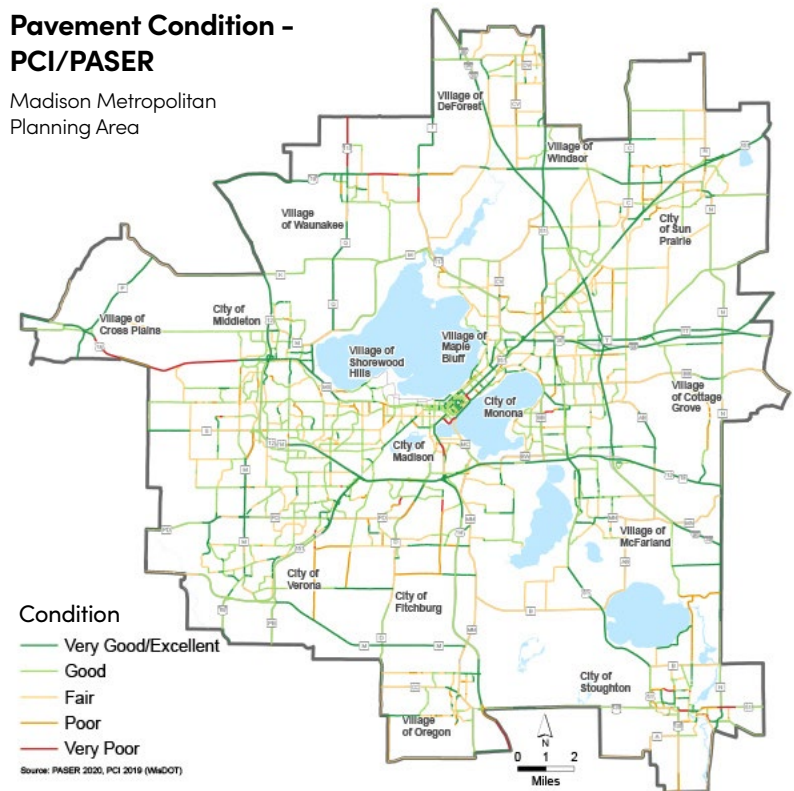
- US Highway (USH) 14 from the Beltline to Cross Plains (very poor to poor) – *Mill and overlay completed in 2020*
- S. Blair Street/USH 151 (very poor) – *Concrete repair and overlay scheduled for 2022*
- S. Park/USH 151 (South of Olin Ave.) (fair to very poor) – *Concrete repair and overlay scheduled for 2022*

The federal pavement condition performance measures, required under the surface transportation bill, are based on four metrics: roughness, cracking, rutting, and faulting. These metrics are combined to yield a condition rating that forms the basis of the performance measure. States and MPOs are required to report the percentage of Interstate and non-Interstate NHS roadway lane miles in good and poor condition.

These performance measures were codified several years ago but, until recently, full data has been available only for roughness, measured using the International Roughness Index (IRI). Transportation planners and engineers in the Madison area found the use of IRI alone to be a less useful measure than PASER/PCI.

Pavement Condition - PCI/PASER

Madison Metropolitan Planning Area



Map 3-c Pavement Condition - PCI/PASER

An analysis of pavement condition in the Madison area is also included in Chapter 5.

BRIDGE CONDITION

The Federal Highway Administration (FHWA) compiles the National Bridge Inventory (NBI), a database with information about every bridge in the US. The federally required bridge condition performance measures—percentage of NHS bridges in good and poor condition—are based on deck, superstructure, substructure, and culvert condition ratings in

the NBI. A bridge's condition is determined by its lowest rated element. If the lowest rating is at least 7, the bridge is classified as good; if it is 3 or below, the bridge is classified as poor. Bridges with their lowest rating between 4 and 6, are classified as fair. The federal performance measure is calculated based on bridge deck area, rather than the number of bridges in each category.

By deck area, 49% of bridges in the metropolitan area are in good condition and 1% are in poor condition. The condition of NHS and non-NHS bridges is shown in Figure 3-b. Map 3-d shows the location and condition of both NHS and non-NHS bridges in the area.

A total of 17 bridges in the metropolitan area were rated as being in poor condition following inspections in late 2019, including the following:

- Century Ave./CTH M at Pheasant Branch Creek – *Bridge replacement scheduled for 2022 pending federal grant*
- STH 30 (WB) at Fair Oaks Ave – *Deck overlay scheduled for 2023*
- US 14 at STH 138
- CTH N at Little Door Creek
- Hoepker Rd. at I-39/90/94
- CTH KP at Black Earth Creek – *Bridge replacement scheduled for 2023*
- Windsor Rd at the Yahara River – *Bridge replacement scheduled for 2022*
- CTH T at Koshkonong Creek

- STH 19 at the Yahara River – *Bridge replacement completed 2020*
- CTH MN at Door Creek
- CTH BB at Koshkonong Creek
- Femrite Dr at Door Creek

TRAFFIC VOLUMES

Between 2010 and 2019, vehicle miles of travel (VMT) increased about 8.5% or an average of a little less than 1% annually, as shown in Figure 3-c. The increase is largely due to population and employment growth.

VMT decreased 15% in 2020, due to the COVID-19 pandemic. VMT has largely, but not completely rebounded since then based on data collected by the MPO, but with continued high levels of teleworking trips are more spread out during the day with more made from home rather than as part of the work trip.

The most significant traffic growth over the past 30 years has occurred on the Beltline between Verona Road and I-39/90 and on I-39/90 between the Beltline and USH

Bridge Condition

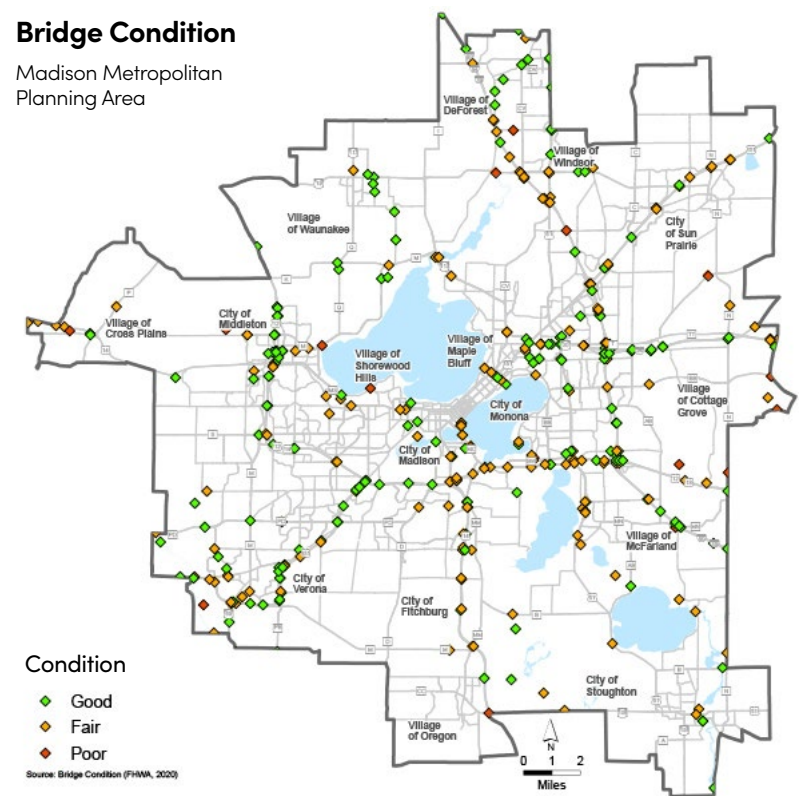
Condition	NHS Bridges		Non-NHS Bridges		Combined	
	#	Percent*	#	Percent*	#	Percent*
Good	112	44%	69	61%	181	50%
Fair	97	55%	85	36%	182	49%
Poor	3	1%	14	3%	17	1%

*by deck area

Figure 3-b Bridge Condition

Bridge Condition

Madison Metropolitan Planning Area



Map 3-d Bridge Condition

Dane County VMT Trends

Year	VMT	% Change
2010	13,258,276	-
2011	13,116,507	-1.1%
2012	13,724,431	4.6%
2013	13,290,950	-3.2%
2014	13,481,513	1.4%
2015	13,637,621	1.2%
2016	14,048,312	3.0%
2017	14,208,516	1.1%
2018	14,406,214	1.4%
2019	14,391,678	-0.1%
2020	12,219,456	-15.1%

Source: WisDOT

Figure 3-c Dane County VMT Trends

151. The Beltline is the only centrally located roadway that directly connects the west and east sides of the metropolitan area. According to data collected for the Beltline Study, over one-half of vehicles exit the Beltline within four interchanges. WisDOT's Flex Lane project will address the demand by providing additional capacity on the Beltline during peak use periods, for those vehicles traveling more than 1-2 exits.

Map 3-e shows 2019 traffic volumes on the arterial roadway system.

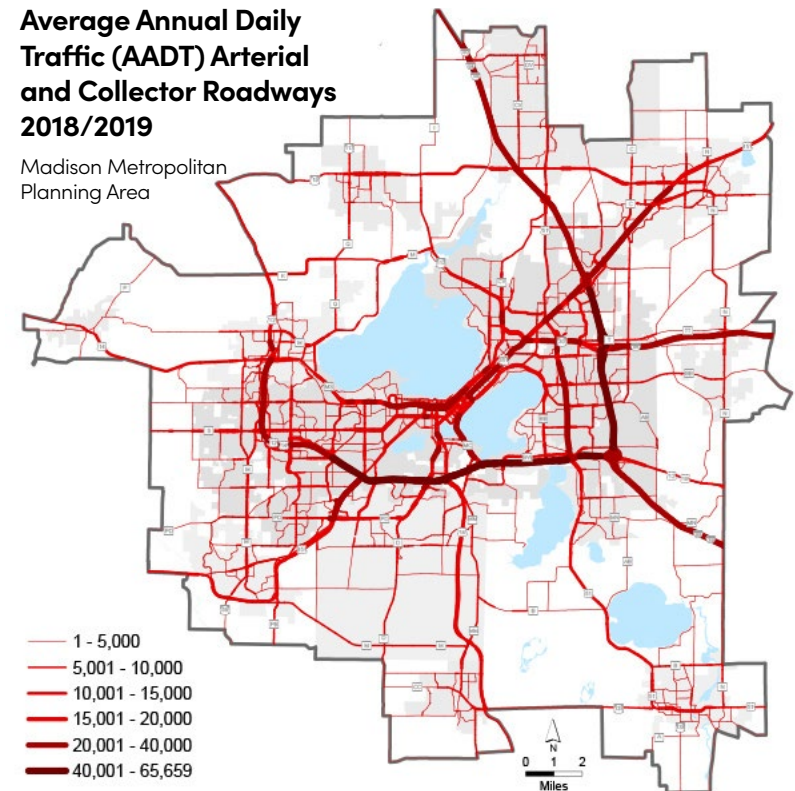
ROADWAY CONGESTION

Congestion is caused when the demand for a transportation facility approaches or exceeds its capacity. Congestion leads to slower travel speeds, vehicle queuing at intersections and interchanges, and can also

impact safety, particularly rear end crashes. Recurring congestion is common during the morning and afternoon rush hour periods on heavily traveled regional roadways. This type of congestion is generally predictable, understood, and accepted by motorists. However, non-recurring congestion caused by construction, crashes, bad weather, and other incidents generates unexpected delays and unanticipated variability in trip travel times. Complicating things, one source of non-recurring congestion can trigger or exacerbate the impact of another. For example, a snow storm may lead to a crash, or a special event near a construction zone may cause extreme delay. Research has shown that these non-recurring causes contribute to nearly half of all congestion. This type of unpredictable congestion is also more frustrating than recurring congestion—causing commuters to be late for work, buses to run late, and freight to miss delivery windows. The MPO maintains a congestion management process (CMP) located in Appendix F which monitors congestion in the region and prioritizes congestion mitigation strategies.

Average Annual Daily Traffic (AADT) Arterial and Collector Roadways 2018/2019

Madison Metropolitan Planning Area



Map 3-e Average Annual Daily Traffic (AADT) Arterial and Collector Roadways 2018/2019

Roadway congestion is common during the morning (7-9 AM) and evening (4-6 PM) peak hour periods on heavily traveled regional roadways, particularly on radial arterials leading to the downtown/campus area and in Beltline and CTH M/K corridors due to our geography, which funnels traffic onto a small number of corridors.

Map 3-f shows generalized traffic congestion on the arterial roadway system using planning level daily traffic volume capacities

in the regional travel model developed by WisDOT using the Highway Capacity Manual.

While congestion has traditionally been measured in terms of the capacity of a roadway, travel time reliability is a more direct measure of how congestion affects roadway users. Travel time reliability measures the variability in travel times that can occur from one day to the next. For most commuters, congestion is understood, anticipated, and planned for, however drivers generally need to budget extra time to allow for unanticipated variability or delays caused by incidents such as weather conditions, work zones, crashes, or special events. Reliability is reported as the travel time index, which is the ratio of travel time in peak periods compared to travel times during normal conditions. A travel time index value of 1.25 indicates that a trip that would typically take 20 minutes would take 25 minutes in heavy traffic conditions ($20 \text{ minutes} \times 1.25 = 25 \text{ minutes}$). An index value of 1.5 or less is considered reliable. Map 3-g shows the morning (7-9 AM) and Map 3-h shows evening (4-6 PM) travel time reliability for major area roadways.

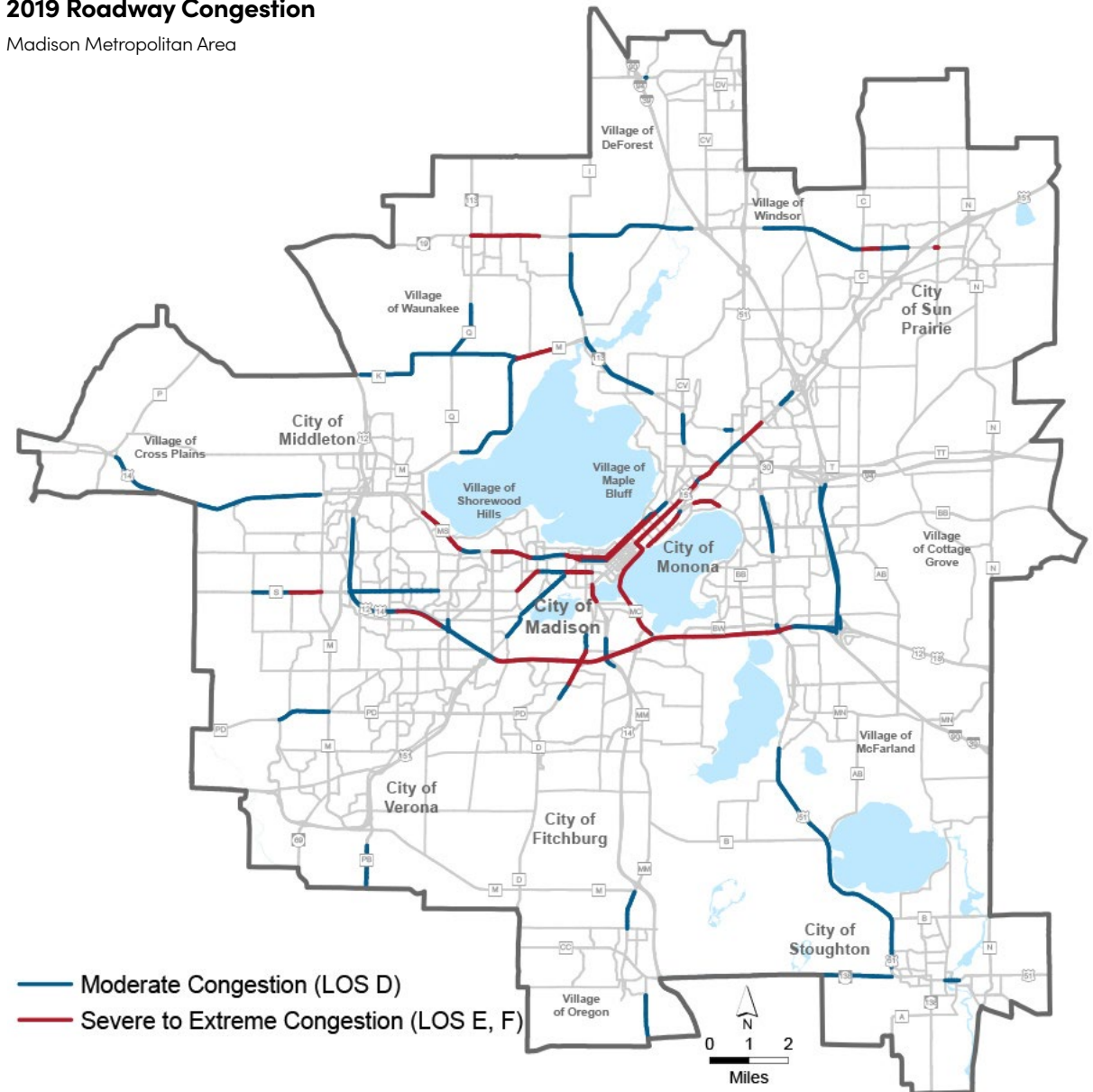
SAFETY

The safety of all roadway users is a top priority. Between 2016 and 2020, Dane County experienced an average of 9,265 crashes per year¹; during this time period there were 164 total crash fatalities and 1,009

¹Crash data from Wisconsin Traffic Operations and Safety (TOPS) Laboratory. Wisconsin MV4000 and DT4000 crash data, excluding crashes with deer.

2019 Roadway Congestion

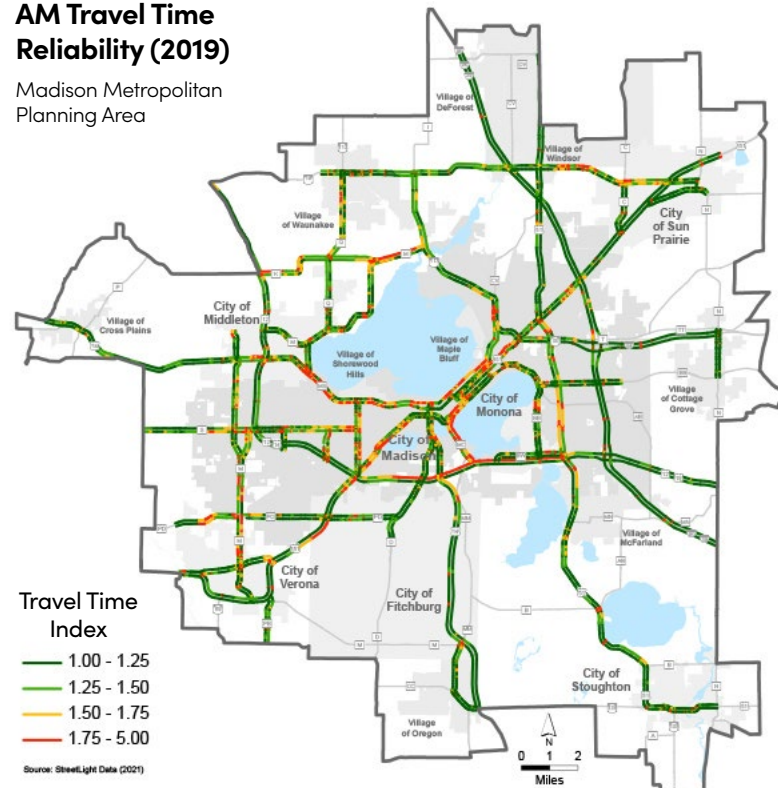
Madison Metropolitan Area



Map 3-f 2019 Roadway Congestion

AM Travel Time Reliability (2019)

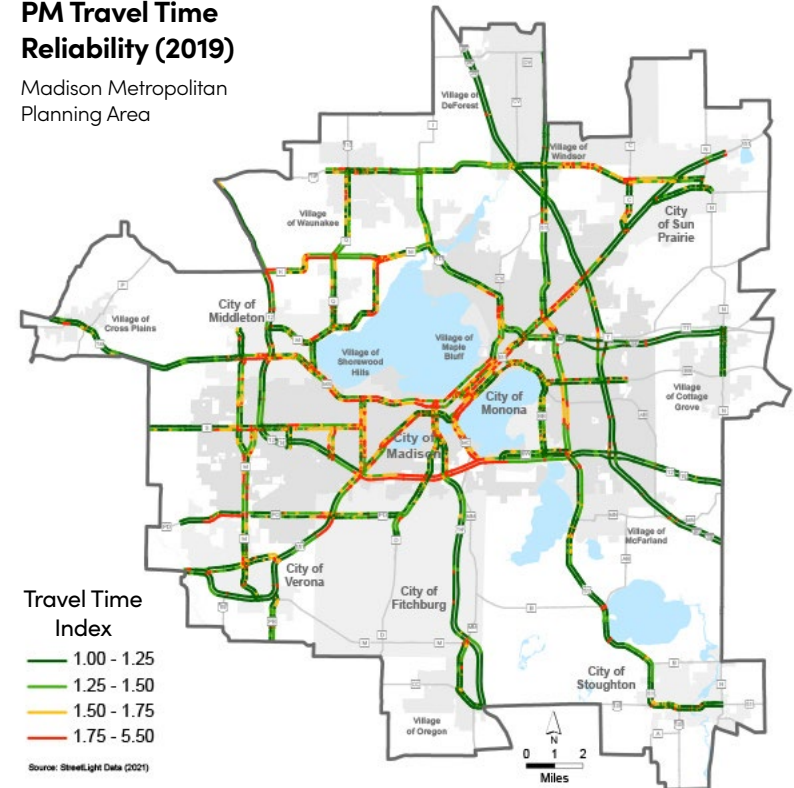
Madison Metropolitan Planning Area



Map 3-g AM Travel Time Reliability (2019)

PM Travel Time Reliability (2019)

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Map 3-h PM Travel Time Reliability (2019)

Dane County Motor Vehicle Fatalities

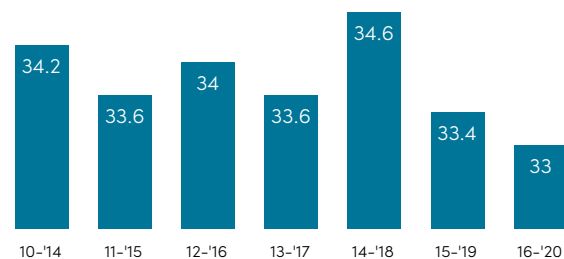


Figure 3-d Dane County Motor Vehicle Fatalities

Dane County Crash Fatalities 2010-2021

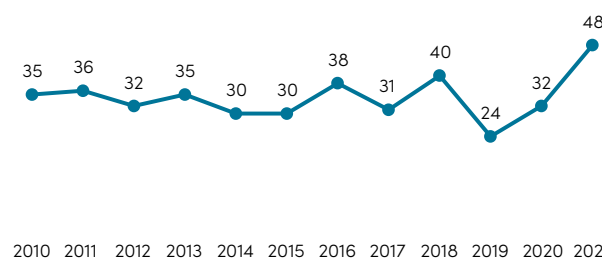


Figure 3-e Dane County Crash Fatalities 2010-2021

serious injuries. 75% of crashes resulted in property damage only. Traffic fatalities had been generally decreasing over the years as shown by the 5-year rolling averages in Figure 3-d, however as seen in Figure 3-e, 2021 was the deadliest year on Dane County roads in recent history, despite a significant drop in vehicle traffic and overall crashes as a result of the pandemic. Serious injuries as a result of a traffic crash have continued to rise in recent years, as shown in Figure 3-f. Vulnerable roadway users -

Dane County Motor Vehicle Serious Injuries

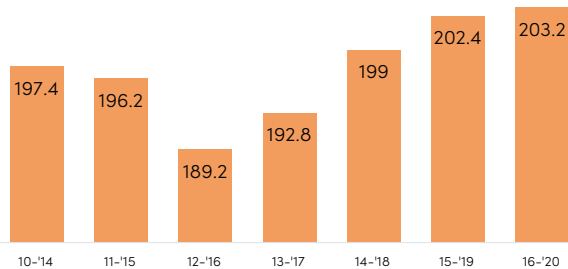


Figure 3-f Dane County Motor Vehicle Serious Injuries

Dane County Non-Motorized Fatalities and Serious Injuries

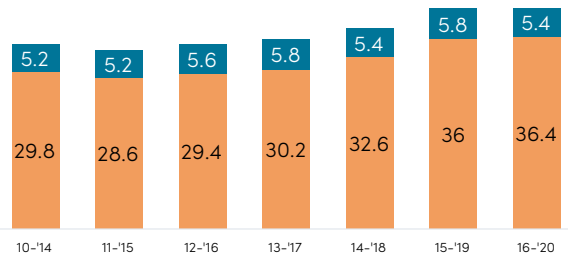


Figure 3-g Dane County Non-Motorized Fatalities and Serious Injuries

bicyclists and pedestrians – continue to make up a disproportionate share of roadway fatalities and serious injuries, shown in Figure 3-g. Over the past five years, the most common contributing factors to crash fatalities include: not wearing a seatbelt (36% of fatal crashes), speeding (29% of fatal crashes), and drug and/or alcohol impairment (25% of fatal crashes).

Map 3-i shows the “hotspot” density of crashes from 2016–2020. As expected, the highest volume arterials, as well as the

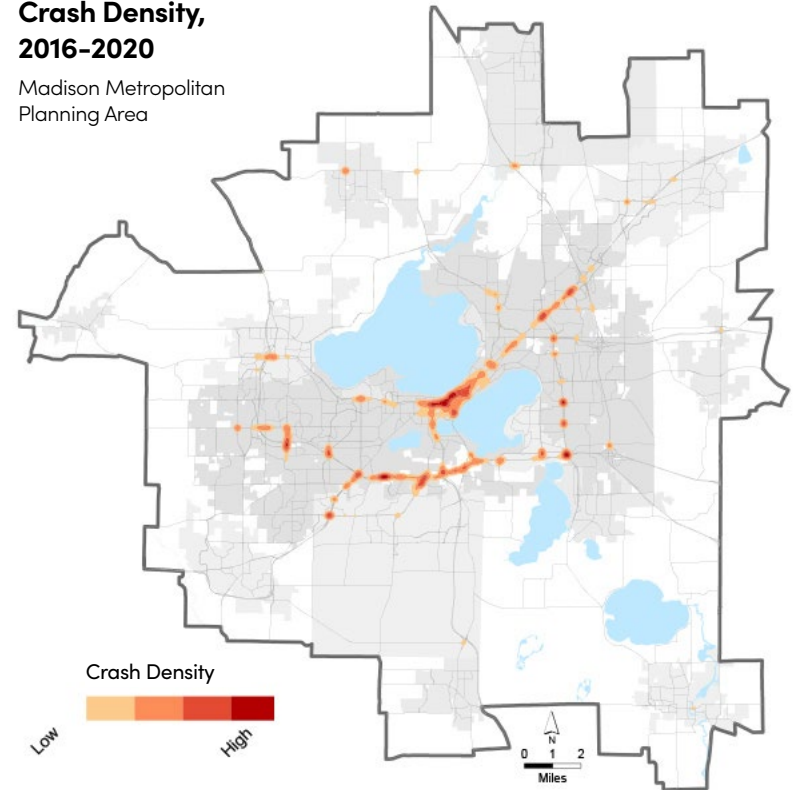
isthmus area, have the highest density of total crashes.

The University of Wisconsin–Madison (UW) Traffic Operations & Safety (TOPS) Lab completed an intersection network safety network screening analysis for the MPO. The analysis ranked all arterial and collector intersections in the planning area by the total number of crashes, crash rate, and crash severity using crash data from 2017–2020. A map of the top 100 ranked intersections by crash frequency is shown in Map 3-j. The top 10 intersections ranked by severity include:

- East Washington Ave and Stoughton Rd
- Stoughton Rd and Broadway
- East Washington Ave and Zeier Rd
- Stoughton Rd and Buckeye Rd
- Stoughton Rd and Pflaum Rd
- Monona Dr and Broadway
- East Washington Ave and First St
- Gammon Rd and Watts Rd
- John Nolen Dr and Rimrock Rd
- Packers Ave and International Ln

Crash Density, 2016–2020

Madison Metropolitan Planning Area

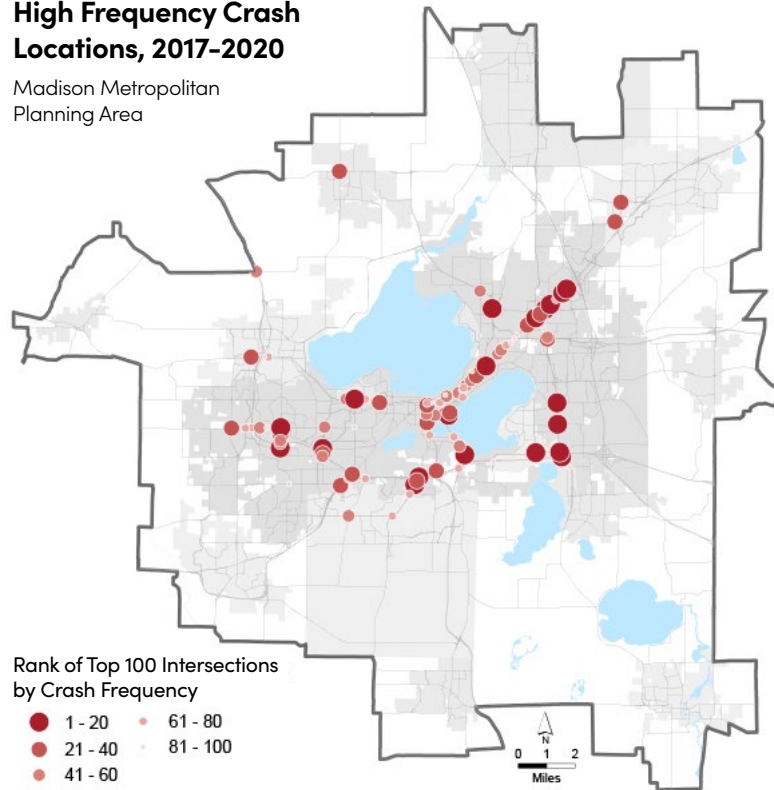


Map 3-i Crash Density, 2016–2020

The City of Madison adopted a Vision Zero policy in 2020. Vision Zero is a data driven strategy intended to eliminate traffic deaths and severe injuries on city streets. The City of Madison Vision Zero initiative strives to improve pedestrian and bike safety for all users throughout the city and improve the identified high injury intersections, all in an effort to prevent avoidable fatal crashes. A key Vision Zero strategy is reducing speed limits, and as part of their Vision Zero initiative, the City lowered speed limits on segments

High Frequency Crash Locations, 2017-2020

Madison Metropolitan Planning Area



Map 3-j High Frequency Crash Locations, 2017-2020

of East Washington Ave, Cottage Grove Rd, Whitney Way, Mineral Point Rd, Gammon Rd, McKenna Blvd, and Milwaukee St. Madison is rolling out a “20 is Plenty” program focused on reducing speed limits on residential streets. The City of Sun Prairie also adopted a Vision Zero policy in 2021, establishing a pedestrian safety task force and reducing the speed limit on Main Street.

The MPO is an active member of the Dane County Traffic Safety Commission (TSC). The TSC meets quarterly to review traffic crash

data in order to enhance the level of safety on all public roadways in Dane County for all roadway users. The TSC is comprised of representatives including planners and engineers, law enforcement, medical professionals and other interested community participants to foster a coordinated effort to address the “4 E’s” of road safety: Education, Enforcement, Engineering, and Emergency Care. The MPO assists with compiling crash statistics and facilitating the crash incidence review. The MPO is currently assisting with a project to develop recommendations for how the TSC reviews and acts on crash trends and to develop a coordinated 4 E program to address identified problem safety issues.

INTELLIGENT TRANSPORTATION SYSTEM (ITS) AND TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)

An Intelligent Transportation System (ITS) is a collection of technologies or systems (e.g., advanced sensors, computers, communications systems, etc.) that enable multiple agencies to work together to collectively manage a transportation network. ITS can be applied to the region’s

transportation infrastructure of highways, streets, bridges and to a growing number of vehicles, including cars, buses and trucks. ITS elements can also assist in the safe movement of bicycles and pedestrians and can improve transportation providers’ (e.g., governments, transit agencies, emergency responders) ability to offer services to the public. ITS technologies can help:

- Collect and transmit information on traffic conditions. This information can be used in real-time to notify users so they can adjust their plans and by operators to better manage the transportation network. Historical information can be used to monitor how conditions change over time and to implement fixes and tweaks so that strategies can be set in place prior to when impacts are expected.
- Decrease congestion by reducing the number of traffic incidents, clearing them more quickly when they occur, and rerouting traffic flow around them to decrease emergency response times and to improve quality of life of those users that would otherwise be impacted by incidents.
- Improve the efficiency of transit, maintenance, and emergency response agencies.

Examples of ITS infrastructure include:

- Adaptive traffic signals
- Connected signals and vehicles – something being pilot tested in the Park Street corridor

- Ramp metering
- Transit signal priority
- Travel information systems, including dynamic messaging signs
- Road weather information systems
- Traffic cameras to allow monitoring of traffic conditions
- Bluetooth sensors
- Automatic traffic recorders

Map 3-k shows traffic signals, including adaptive signal corridors, and ramp meters. Map 3-l shows traffic cameras and real-time message signs.

Madison's Transportation Systems Management and Operations (TSMO) Program combines robust communication networks with innovative software applications to manage traffic operation using physical and virtual user interfaces. These tools allow for remote monitoring and response to traffic conditions in real time. Traffic engineers are able to apply state-of-the-art tools and technologies to reduce congestion and delay, enhance safety and improve the overall utility of Madison's transportation network to support cost-effective economic growth in the region in a more sustainable manner.

The City of Madison's Traffic Engineering team recently received international distinction and the *2021 Transportation Systems Management & Operations Council Organization Award* by the Institute of Transportation Engineers

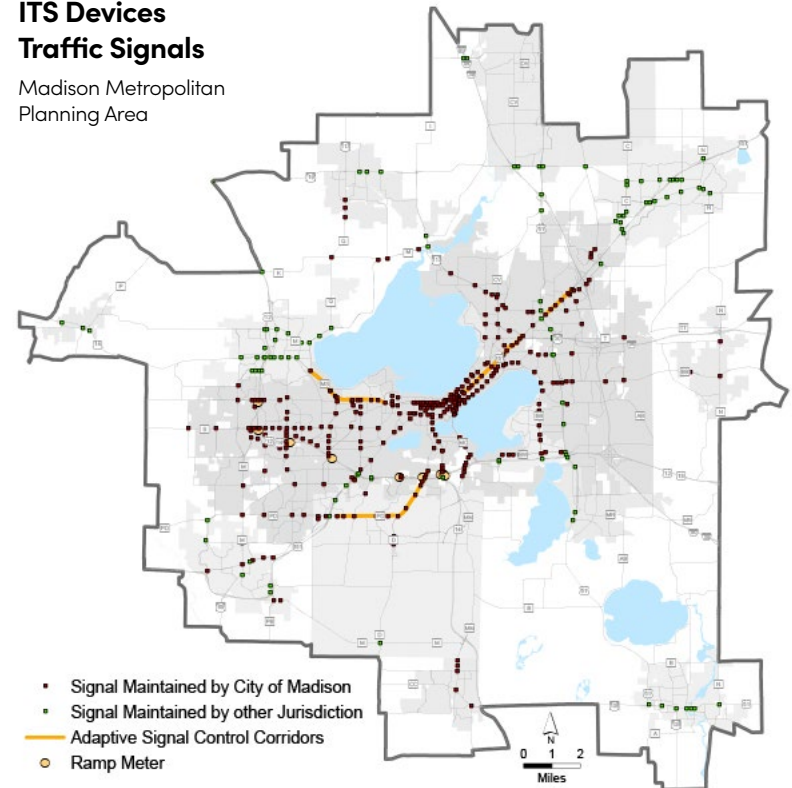
(ITE). The specific award Madison received seeks to recognize organizations that demonstrate the successful use of Intelligent Transportation System (ITS) technologies to improve the efficiency of surface transportation facilities with significant societal mobility.

Key components that comprise the City of Madison's Transportation Systems Management and Operations (TSMO) Program include:

- Low-cost Physical and Virtual Traffic Management Center – an area located in the city's downtown Traffic Engineering office, featuring a video wall and management tools for engineers and operators to remotely monitor traffic and make changes to devices in the field.
- Fiber Network Communication – city-owned infrastructure by which information transmits to devices and facilities around the City.
- Traffic Condition Monitoring – visual verification of operations and traffic incidents provided by online congestion mapping and strategically placed traffic cameras throughout the city's transportation network.

ITS Devices Traffic Signals

Madison Metropolitan Planning Area

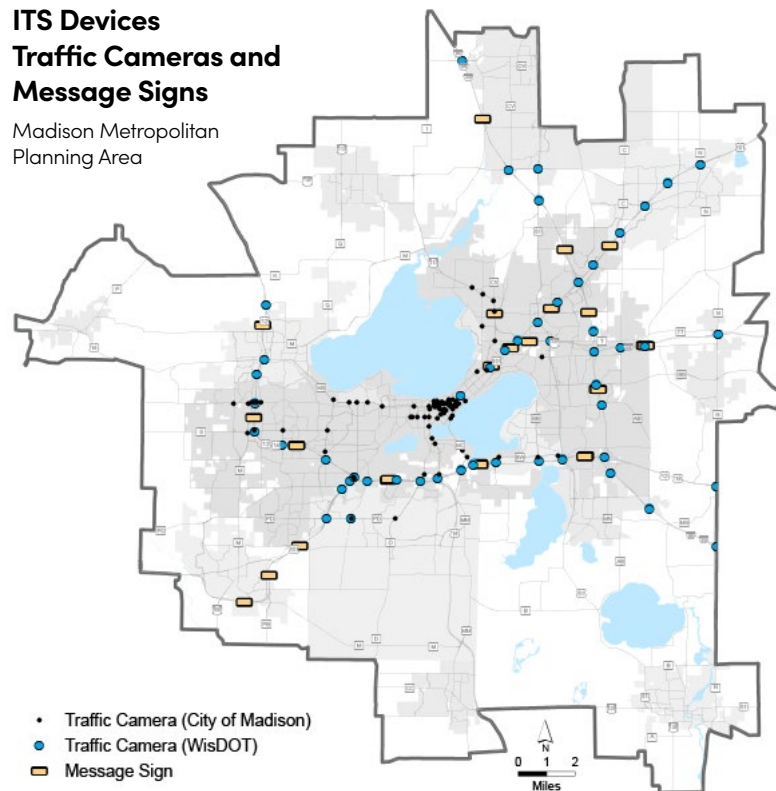


Map 3-k ITS Devices Traffic Signals

- Advanced Traffic Signal Management Software – an application that allows engineers the ability to respond and adapt traffic signals to changing conditions.
- Asset Management – the coordination of staffing resources and information related to traffic engineering infrastructure around the City.
- Traveler Information – a Waze-based application that allows city staff to share real-time incident information with road users.

ITS Devices Traffic Cameras and Message Signs

Madison Metropolitan
Planning Area



Map 3-I ITS Devices Traffic Cameras and Message Signs

Recently, the program played a critical role in response to changing travel demands resulting from COVID-19. The program includes many Intelligent Transportation System (ITS) components and promotes a culture of effectively managing and operating the transportation system instead of constantly expanding the infrastructure. Not only does this program provide solutions to today's issues such as COVID-19 response, it also positions Madison to be better able

to adapt to growth and technological challenges in the future.

ELECTRIC VEHICLES AND ALTERNATIVE FUEL CORRIDORS

Electric vehicle (EV) and other alternative fuel vehicle (AFV) use is growing rapidly across Wisconsin and the country. Alternative fuels include hydrogen, propane, and natural gas. These vehicles rely on charging and fueling station infrastructure that match their vehicle type to travel successfully.

Electric charging is the most common alternative fuel option. Approximately 80% of electric vehicle charging is done at home, and workplace charging options are expanding, however

acceptable levels of public charging station infrastructure is important to reduce range anxiety. There are three levels of electric charging:

- Level 1 charging is the most basic, using a standard electrical outlet. This can be used for home charging, and requires the greatest amount of charging time to fully recharge, up to 1-2 days depending upon battery size.

- Level 2 charging uses a 220-240 volt outlet. It can take up to 8 hours to fully recharge a using level 2 charging.
- Level 3 charging is also called fast- or supercharging. Level 3 can fully recharge an EV battery in around an hour depending upon battery size.

There are 100 public EV chargers in the Madison area, 16 of which are high power or supercharging stations, shown in Map 3-m.

Federal Highway Administration (FHWA) Alternative Fuel Corridor Designation Program

The Alternative Fuel Corridor (AFC) Designation Program was established by Section 1413 of the FAST Act to create a national network of alternative fueling and charging infrastructure along National Highway System (NHS) corridors. Current designations of Alternative Fuel Corridors (AFC) cover over 145,222 miles of the NHS.

There are two designation types available for a given corridor:

1. "Corridor-Ready": Route has enough facilities to warrant signage indicating locations of alternative fueling stations
2. "Corridor-Pending": Route does not yet have enough facilities to warrant signage. FHWA coordinates with state and local entities to bring corridor-pending routes up to corridor-ready.

Designation status is based on a maximum distance between fuel stations of the same type along the corridor:

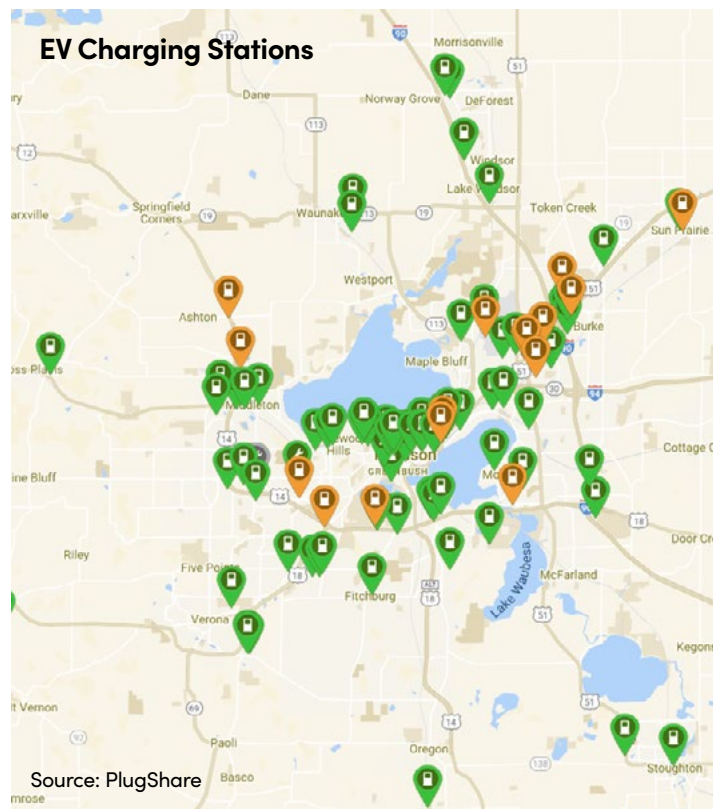
- **EV charging:** EV charging facilities at 50-mile intervals along designated EV corridors. I-94, and portions of I-39/90 from Edgerton to US 51 north of Madison, and US 151 from the Beltline to STH 19 in Sun Prairie are designated as corridor-ready EV corridors.
- **Propane:** Propane fueling facilities at 150-mile intervals along designated propane corridors. I-39/90 and I-94 are designated propane fuel corridor-ready.
- **Natural gas:** Compressed natural gas (CNG) and liquefied natural gas (LNG) facilities at 150-mile intervals and at 200-mile intervals respectively, along designated corridors. The entirety of US 151, I-39/90, and I-94 is designated as CNG corridor-ready routes. There are no LNG corridor-ready routes in the region.



Public Transit

TRANSIT SERVICE PROVIDERS

Metro Transit, operated by the City of Madison, provides the majority of public transportation service in the Madison metropolitan area. The agency contracts with the cities of Middleton, Fitchburg, Sun Prairie, and Verona, as well as the University of Wisconsin and other entities to provide service outside the City of Madison. Metro operates a fleet of about 215 fixed-route buses, as well as contractor-provided point-to-point



Map 3-m EV Charging Stations

paratransit service for qualifying people with disabilities.

As shown in Figure 3-h, ridership on Metro Transit increased rapidly following the City of Madison's acquisition of the Madison Bus Company in 1970, spurred by spiking oil prices in the 1970s, peaking in 1979. Throughout the 1980s ridership declined before beginning a period of moderate growth in the 1990s that accelerated in 2000s, reaching a high of 15.2 million in 2014. Ridership then

began a decline, exacerbated by the COVID-19 pandemic—which reduced annual ridership to less than 37% of pre-pandemic levels in 2020. The causes and implications of the pre-COVID decline are unclear but may be linked to lower gasoline prices and the rise of ride-hailing services such as Lyft and Uber. The increase in remote work that followed safer-at-home orders responding to the COVID-19 pandemic is likely to have a long-term impact on ridership, as many employers are expected to continue to allow part-time and in some cases full-time remote work in the post-COVID future. Even so, April 2021 saw year-over-year increases in ridership from April 2020—the first month with a year-over-year increase since the pandemic began in March 2020.

In addition to Metro Transit, the City of Monona operates Monona Express, a fixed-route commuter service during the morning and afternoon peak periods, and Monona Lift, designed primarily to provide transportation for seniors and people with disabilities during mid-day hours. Monona Express operates in a counter-clockwise loop around Lake Monona in the morning and a clockwise loop in the evening. Service is only provided to passengers travelling within Monona or between Monona and Madison.

Annual Fixed Route Ridership 1970-2020

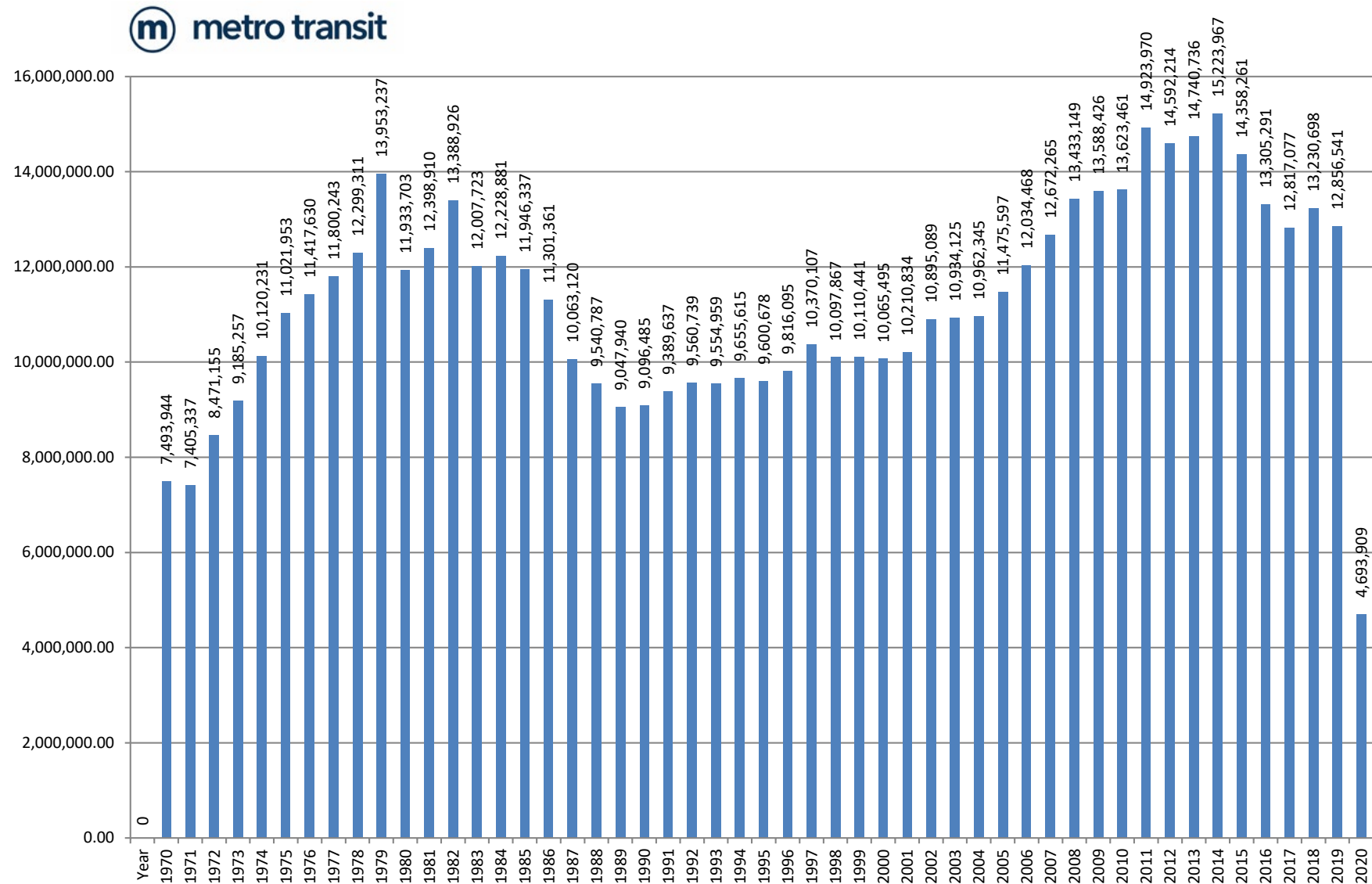


Figure 3-h Annual Fixed Route Ridership 1970-2020

Map 3-n shows the transit route system and service area.

While other communities lack local fixed route transit service, Sun Prairie and Stoughton offer publicly subsidized shared-ride taxi service, primarily for intra-city trips. In addition, Sun Prairie is working with Metro and the MPO to design potential local service routes, which would provide transfer opportunities to the local Sun Prairie BRT extension.

SERVICE LEVELS

Metro Transit operates 47 mainline fixed routes² and several supplemental school day routes serving Madison's public middle and high schools. Service is currently designed around four transfer points with most routes operating every 30 minutes during weekday peak periods and every 30 to 60 minutes off peak if service is offered during those times. Timed transfers at the transfer points allow for connections throughout Metro's service area. Many routes overlap in central Madison to provide service in some corridors every 15 minutes or better. While the transfer point system theoretically provides the opportunity for riders to travel throughout the Metro service area, it often requires out-of-direction travel and can result in travel times in excess of 1.5-2 hours for common one-way trips between peripheral areas.

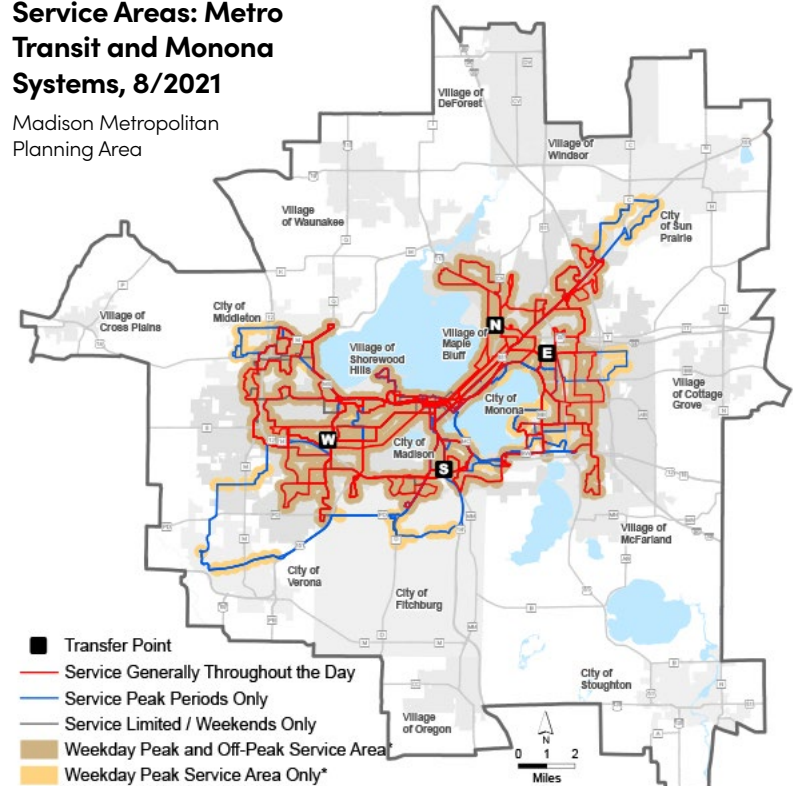
² November 2021; pre-pandemic, Metro operated as many as 62 mainline fixed routes.

Metro Transit's service (2022) is concentrated in the morning and afternoon peak periods with about 125 buses in operation during those times. Fleet utilization drops to about 75 buses during the middle of the day on weekdays and 35 on weekends. The added service during peak periods consists of increased frequency on all-day routes, commuter routes that provide faster and more direct service, and supplemental school day routes targeting middle school and high school students. Metro began to phase out provision of contracted middle school student transportation for MMSD in 2019, with that service scheduled to end with the 2021-2022 school year.

Metro is currently working with Jarret Walker + Associates on a study intended to entirely redesign its transit network to integrate with BRT and to align with current service goals. Implementation of new service patterns is expected to begin in summer 2023. Service on the future BRT routes will be provided by conventional buses until BRT service begins in 2024. Map 3-o shows service frequencies during the mid-day period under the draft network plan. Service levels

Service Areas: Metro Transit and Monona Systems, 8/2021

Madison Metropolitan Planning Area

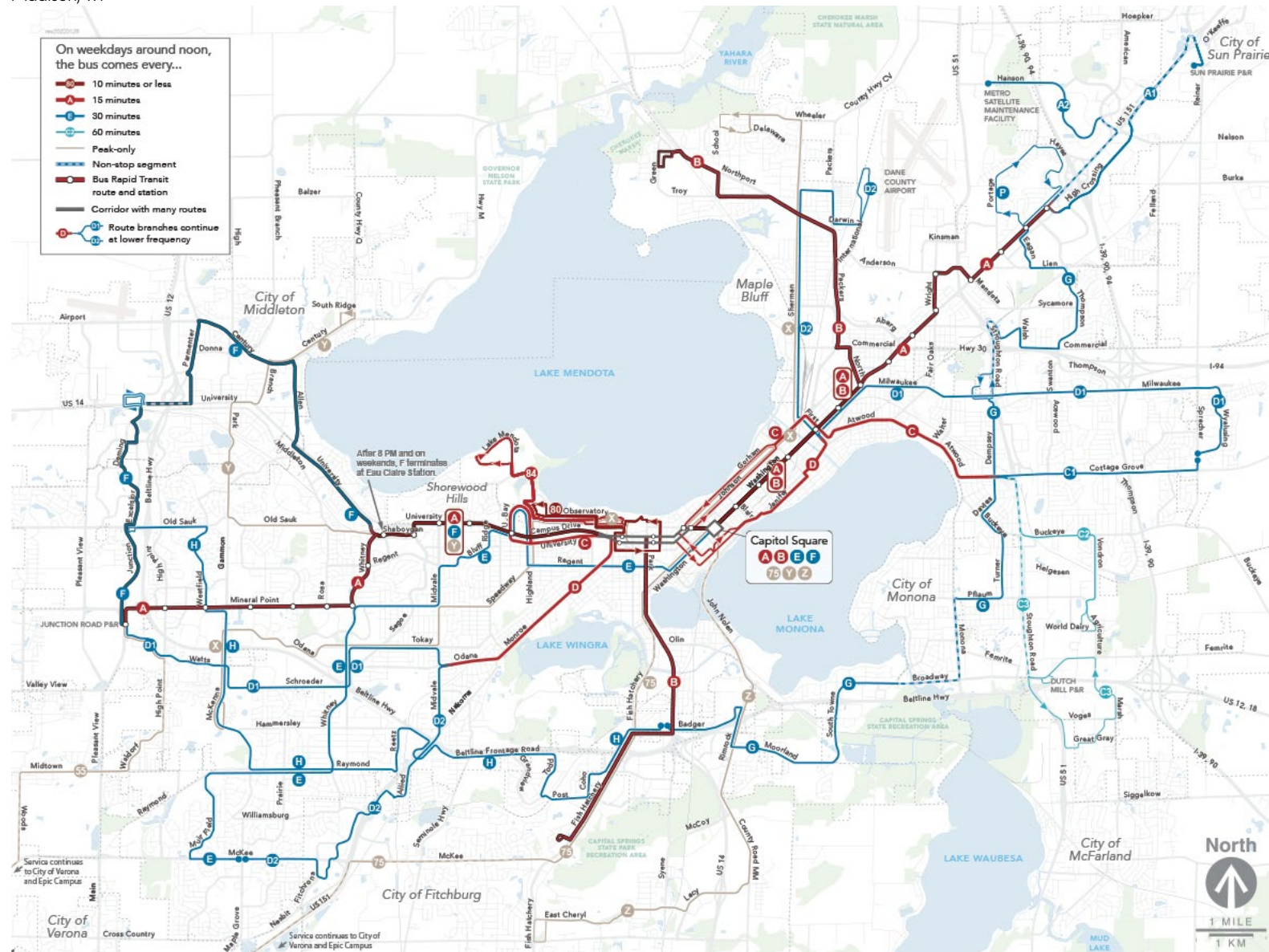


Map 3-n Service Areas: Metro Transit and Monona Systems, 8/2021

would be consistent throughout the service day, until 8 PM on weekdays or all day on weekends, when service frequency would drop. In Map 3-o, service frequencies are indicated by the color of the line showing each route, with frequencies of 15 minutes or less in red, 30-minute headway routes in blue, 60-minute routes in light blue, and peak-only routes in tan. Route designations (e.g. A, B, C, D1, D2, 75) are for planning purposes only.

Draft Network Plan

Madison, WI



Map 3-o Draft Network Plan

BUS OPERATIONS

Metro Transit dispatches its fleet of about 220 buses from a single bus storage and operations facility on East Washington Avenue at Ingersoll Street. The facility was renovated in 1981 with the intent of housing a fleet of about 160 buses and is currently operating beyond capacity. A multi-phase facility improvement plan began in 2019, with phase 3A scheduled to be completed in August 2022. Metro is currently planning and designing the remodel of a new satellite facility on Hanson Road, which will accommodate 96 to 104 60-foot articulated buses, as well as providing bus fueling and maintenance lanes, driver spaces, and administrative offices. This facility will support the Bus Rapid Transit and other fixed-route operations.

Metro Transit's fixed-route fleet consists almost entirely of standard-length 40-foot diesel transit buses, about 10% of which are hybrid diesel-electric. Metro took delivery of three electric buses in 2021 that will enter service in 2022. Metro Transit, in coordination with the MPO, conducted a *Bus Size Study* in 2014 reviewing the fleet make-up. The study concluded that although the uniform fleet cost-effectively serves the area, the overcrowding problems encountered on several routes could be solved with larger 60-foot long articulated buses. Further, a few buses could be replaced with shorter 30-foot buses, although the small number of 30-foot buses combined with similar operating costs would not result in large cost savings. Metro will use new articulated 60-foot buses

for the East-West BRT system, as well as the North-South BRT, Middleton, Sun Prairie, and American Center local service extensions.

FUNDING

Funding for public transportation in the Madison area is derived primarily from four sources – fares, local investments (primarily from property taxes), federal grants, and state operating grants. As Metro Transit is a City of Madison utility, some service, particularly service provided outside the city limits, is funded through partner agreements where other municipalities or institutions cover the local share. Figures 3-i and 3-j show Metro Transit's Operating and Capital budget funding summaries for 2020.

Metro Transit's funding and governance structure as a city-owned utility is fairly uncommon. A Regional Transit Authority, which would raise revenue in the transit service area, has been explored but is not currently allowed by state law. Enabling legislation was granted in 2009 and rescinded in 2010.

SPECIALIZED TRANSIT

The majority of specialized transportation open to the public is supported by Metro Transit and Dane County. A variety of private organizations and service providers help bring the service to the public.

Metro Transit provides its paratransit service in accordance with the Americans with Disability Act. The paratransit network shadows the all-

Metro Transit 2020 Operating Funding Summary

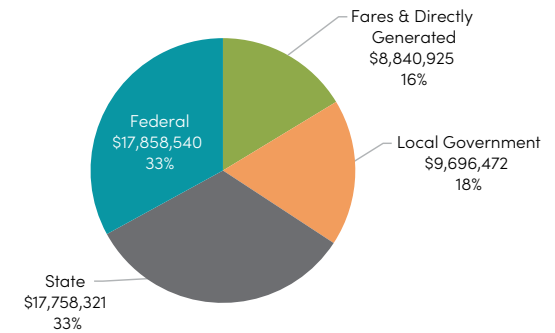


Figure 3-i Metro Transit 2020 Operating Funding Summary

Metro Transit 2020 Capital Funding Summary

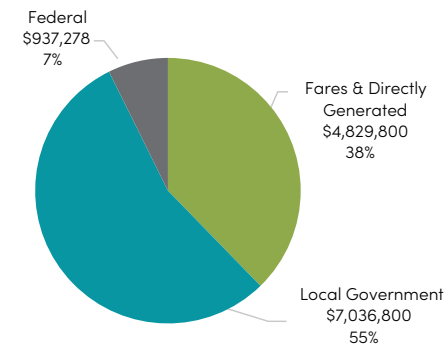
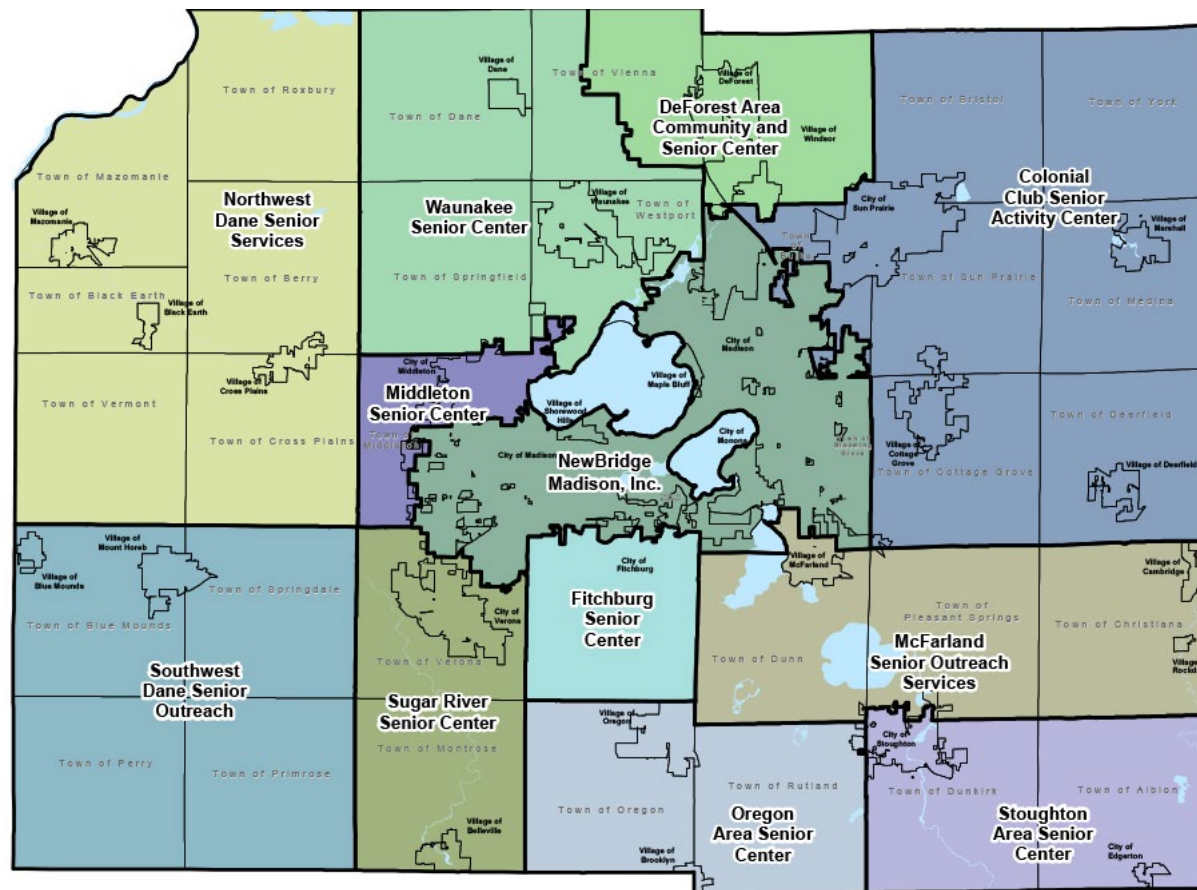


Figure 3-j Metro Transit 2020 Capital Funding Summary
day fixed-route bus system, excluding peak-period commute-oriented service. Paratransit service is provided on a demand-responsive, advance-reservation basis for people who are unable to use Metro's regular fixed-route service. Metro contracts with private providers for paratransit service. Metro contracted 113,301 paratransit trips in 2019.

2021 Dane County Senior Focal Points



Senior Focal Points correspond to Rural Senior Group Transportation Program (RSG) and Group Access Service (GAS) areas; New Bridge Madison, Inc. Focal Point is served by multiple GAS areas.



Map 3-p 2019 Dane County Senior Focal Points

The Adult Community Services Division of the Dane County Department of Human Services (DCDHS) administers wheelchair-accessible routed group ride and demand-responsive services for seniors and people with physical or developmental disabilities. The service

is provided entirely through contracts with private service providers. DCDHS operates a one-call center to help coordinate these services as well as external resources and to help riders easily connect with the appropriate service.

The group ride services are divided into Group Access Service in urban neighborhoods and Rural Senior Group Transportation Program outside of the Madison/Middleton area. The services provide regularly scheduled weekday routed group trips for seniors (age 60 and older) and people with disabilities who live in their own homes in Dane County. The service is neighborhood-based, connecting residential areas to nearby nutrition sites, grocery/general shopping areas, and other destinations. During the COVID-19 pandemic, group access services transitioned to meal and grocery delivery services in order to provide vital nutrition access for eligible participants.

Map 3-p shows the group ride services focal points around which the service is organized.

The public shared-ride taxi systems in Sun Prairie and Stoughton offer accessible service that is generally door-to-door. Several private taxi companies operate in the Madison area; however, only Union Cab offers wheelchair-accessible service. The Dane County Accessible Taxi Service (DACTS) was formed as a non-profit in 2021; beginning in 2022, this entity will provide accessible taxi vehicles to Union Cab for prioritized dispatch services for eligible riders.

Other specialized transportation services fill various needs. The Retired Senior Volunteer Driver Escort Program (RSVP) provides individual door-through-door rides to medical trips for adults aged 60 and over

and for people with disabilities with volunteer drivers in their own vehicles. The Veterans Helping Veterans program provides veterans of all ages and their family members with rides to needed appointments and services. Private Non-Emergency Medical Transportation (NEMT) providers offer rides throughout Dane County and beyond; many NEMT providers operate on a shared-ride model to improve operational efficiency. YW Transit³ provides four primary services county-wide:

- Contracted Community Rides: Rides to community agency programs for individuals isolated by poverty, age, disability, and language barriers.
- JobRide: Rides for low-income people going to/from work.
- Sexual Assault Prevention: Rides at night for potential victims of sexual assault and those in domestic violence situations.
- Specialized Transportation: Rides for seniors and people with disabilities to access their communities and needed services.

Specialized Transportation is discussed in more detail in the *2019-2023 Coordinated Public Transit – Human Services Transportation Plan for Dane County*.⁴

³ YWCA transportation program

⁴ https://www.greatermadisonmpo.org/planning/documents/2019_CoordinatedPlan_FinalForWeb.pdf



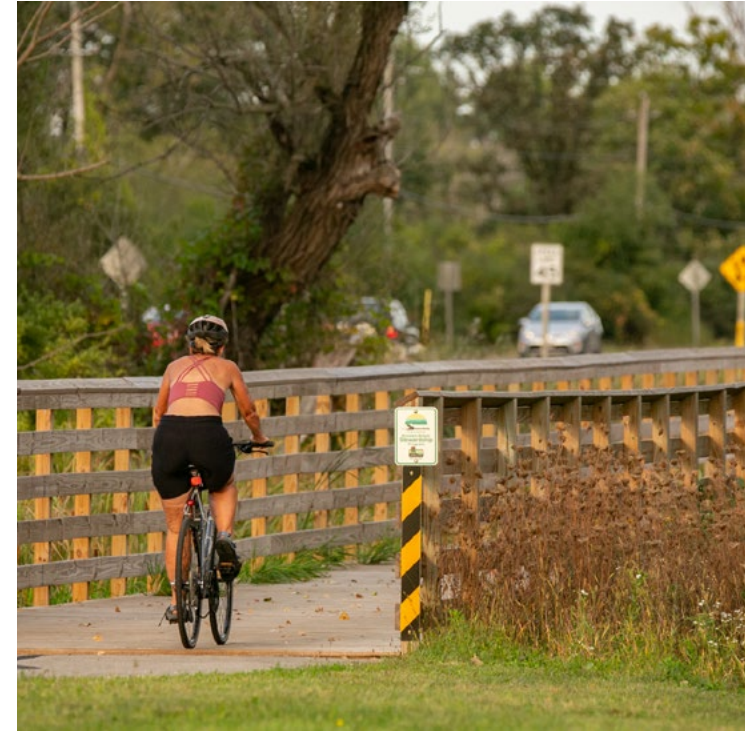
Bicycles

EXISTING BIKEWAY SYSTEM

The Madison metropolitan area is served by an interconnected bikeway network consisting of off-street shared-use paths, on-street bike lanes, and local street networks. Bikeway construction began in earnest in the 1990s and most roadway projects now feature provisions for pedestrians and bicyclists. Several rail and other corridors have been utilized to build high quality shared-use paths.

The [2015 Bicycle Transportation Plan](#) organized components of the bikeway system into a regional network of primary and secondary bicycle routes consisting of on-street and off-street segments. This network helps planners visualize the bikeway network as it is used by cyclists, identify gaps, and prioritize improvements. The Bicycle Transportation Plan identified regional bicycle infrastructure needs and outlined recommended path segments to improve regional connectivity. Updates were made to the planned regional network as part of the last Regional Transportation Plan (RTP) adopted in 2017 and are being made as part of this RTP update.

Most communities in Dane County also engage in bikeway planning. The Cities of [Fitchburg](#), [Middleton](#), [Monona](#), and [Verona](#) have bicycle and pedestrian plans while the City of [Madison](#) has adopted the regional bicycle transportation plan. The City of Sun



Prairie's [2019 Comprehensive Plan](#) calls for adoption of an Active Transportation Plan.⁵ Many neighborhood and comprehensive plans also plan for bicycle infrastructure. The City of Madison also plans for bicycle infrastructure as part of neighborhood development plans.

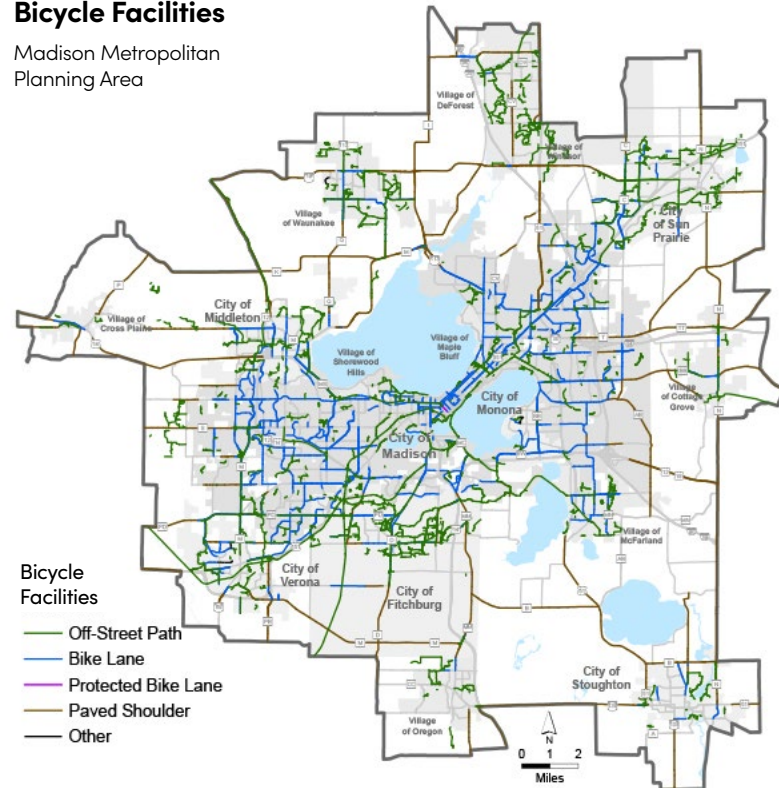
BICYCLE FACILITIES

Bicycle facilities include off-street facilities, most commonly shared-use paths, and on-street facilities, such as bike lanes and paved shoulders.

⁵ P 8-8

Bicycle Facilities

Madison Metropolitan Planning Area



Map 3-q Bicycle Facilities

Shared-use paths are the most comfortable bicycle facilities because they eliminate the need for a bicyclist to interact with traffic outside of street crossings. Shared-use paths are typically built along railroad corridors, street and highway corridors, through parks, and in other locations where land can be secured. However, they often do not provide direct access to homes and businesses.

Bike lanes are used on arterial and collector streets to separate bicyclists from traffic. They may be separated from traffic with a buffer

space or vertical element like a curb or row of parked cars. Contra-flow bike lanes are used on one-way streets to allow two-way bicycle traffic.

Paved shoulders wide enough for bicycle use (ideally 5 feet or more) are used in rural areas where vehicle and bicycle traffic is relatively low. They operate similarly to bike lanes but also provide other benefits, including reducing several crash types, improving roadway drainage, and serving as an emergency stopping space for motor vehicles.

New bicycle facilities are generally added during street reconstruction projects, if possible. Bicycle facilities are chosen based on many factors, including the projected usage, safest design, cost, and available space. Map 3-q shows existing bicycle facilities.

SAFETY

In the 2018 [Dane County Bicycle and Pedestrian Crash Study](#), the MPO identified common features of crashes in which bicyclists and pedestrians were struck by motor vehicles in order to guide safety improvement efforts, measure the change in

bicycle safety since the City of Madison's 1992 bicycle crash study, and set a benchmark for future safety performance measurement in the Madison metropolitan area and Dane County.

During the study period, 2011-2015, there were 798 documented motor vehicle crashes involving bicyclists, 6 (1%) of which were fatal and 58 (7%) of which were classified as "incapacitating." The most severe injuries were highly correlated with high traffic speeds, with 5 of 6 (83%) fatal crashes occurring on roads with speed limits of at least 35 mph, despite these roads accounting for only 20% of reported bicycle crashes.

In developed areas, the vast majority of crashes took place at intersections; in rural areas, most took place at non-intersection locations. The most common crash type, accounting for 22% of all crashes, involved left-turning motorists colliding with oncoming bicyclists at intersections.

One of the most interesting findings of the study was the importance of travel direction to crash risk. While bicyclists normally travel in the same direction as adjacent motor vehicles, on sidewalks and roadside shared-use paths they may travel in either direction. The number of crashes involving bicyclists on these facilities traveling against traffic is more than 3.5 times those involving bicyclists traveling with traffic. This disparity does not appear in pedestrian crashes and suggests that bicyclists' higher speeds may put them at particular risk when traveling against traffic.

Bicycling in the City of Madison appears to have gotten substantially safer in recent decades. During the 1987-1990 period, the City had an annual bike crash rate of 101.7 per 100,000 population, in the 2011-2015 period, the rate was 51.4 crashes per 100,000 population despite a higher rate of bicycle commuting. One likely factor driving this improvement was the dramatic expansion of on- and off-street bicycle facilities during the intervening years.

LEVEL OF TRAFFIC STRESS (LTS)

As bicycling has grown in importance as a means of day-to-day transportation, the MPO has adopted new planning tools to better understand and improve conditions for bicyclists in the Madison area, beyond bicycle-specific infrastructure such as shared-use paths and bike lanes. In 2018, the MPO began using Bicycle Level of Traffic Stress

(LTS) to evaluate the traffic-related stress experienced by bicyclists based on roadway design, traffic volumes, traffic speeds, and other factors. LTS is an objective, data-driven way to rate the bike-friendliness of roads on an easily understandable four-level scale. The low-stress bicycle network is all of the routes, including streets and off-street paths, on which an average adult person would be expected to feel comfortable riding a bicycle, and consists of all routes rated as LTS 1 or 2. LTS 1 is a route that would be comfortable for people of all ages and abilities.

LTS analysis is a particularly valuable planning tool because it reveals the full network within which bicyclists operate. High-visibility bike infrastructure projects represent an important but relatively small portion of the bike network. Connected low-volume streets form its foundation. In some cases, continuous low-volume streets that are used

by higher volumes of bicyclists and for longer journeys may incorporate bicycle priority features such as traffic calming, bike signals and other treatments to reduce delay at intersections, wayfinding signage, and markings such as green pavement

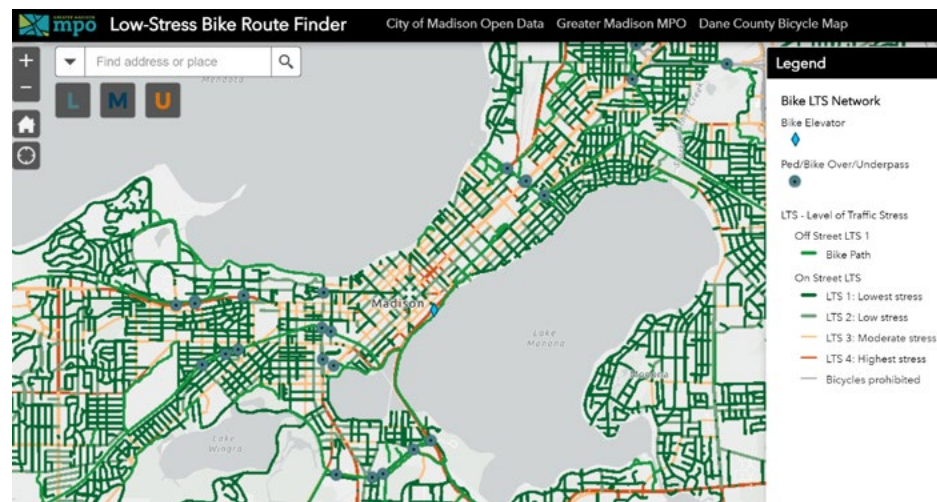
and sharrows. These streets may be signed as “bike boulevards” indicating the priority for bicyclists along the route.

The LTS network is regularly updated and available for public viewing online as the [Low-Stress Bike Route Finder](#). The Low-Stress Bike Route Finder assists persons in finding a route to their destination based on the preferences for stress level. For more information on LTS methodology and uses, see the MPO’s report, [Defining the Madison Area Low-Stress Bicycle Network and Using it to Build a Better Regional Network](#).

BIKE SHARE

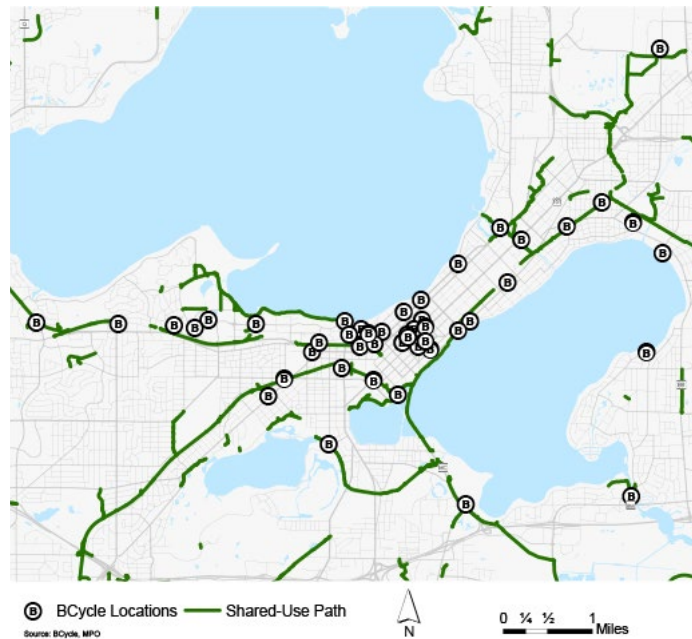
Madison is served by a popular and successful bike-share system operated by BCycle. The system currently operates 334 e-bikes and 52 docking stations, as shown in Map 3-r. Stations are densely clustered in central Madison but extend west to Midvale Boulevard, south to Inland Way in Monona (new in 2021), east to Olbrich Park, and north to Madison College’s Truax Campus.

In 2019 BCycle transitioned its entire fleet to e-bikes and offered free annual passes to UW-Madison students, leading to a massive surge in ridership, as shown in Figure 3-k. While ridership in 2020 declined, it was still more than 80% higher than 2018 levels, and the average trip length grew to 4.3 miles as users took more recreational rides. In 2021 ridership continued to increase over both 2019 and 2020 levels, and the addition of new stations – including two in the City of Monona



BCycle Stations

Madison Metropolitan Planning Area



Map 3-r BCycle Stations

BCycle Ridership and Average Trip Length

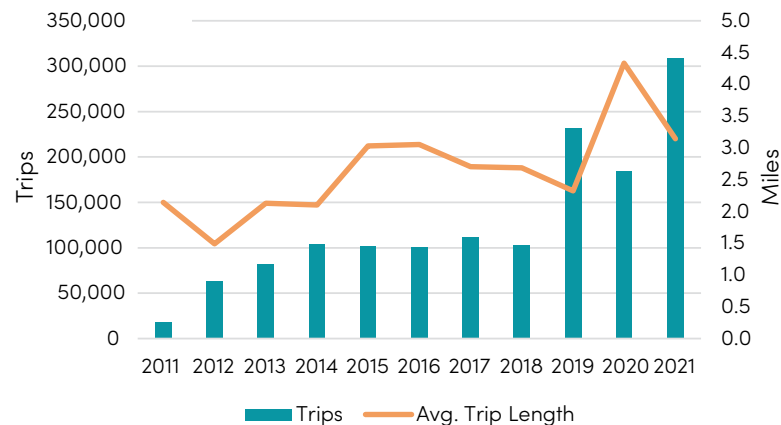


Figure 3-k BCycle Ridership and Average Trip Length

– increased the system’s service area. The first week of September 2021 set a new record of 14,800 B-Cycle trips in a week – the highest usage in BCycle history in any community. In 2021, the system had 309,059 trips, an increase of 67% over 2020 and 34% over the previous record year of 2019.

A BCycle – Madison Public Library Foundation partnership began to offer BCycle fobs that can be checked out by anyone with a library card on September 20, 2021, improving equity and system accessibility for low-income and unbanked persons.⁶ The program provides two access fobs and helmets at each of the nine Madison Public Library locations.

EDUCATION AND ENCOURAGEMENT PROGRAMS

Education and encouragement programs help people of all ages, backgrounds, and abilities make use of bicycling infrastructure. These programs help people learn to use the roads and paths safely, as well as assist those who are new to bicycling to start riding. Programs also help ensure that motorists understand their responsibilities in ensuring

⁶ <https://www.madisonpubliclibrary.org/bcycle>

that the Madison area is a safe place to bike. In addition to local and neighborhood-specific education events, Madison School & Community Recreation offers a [Learn 2 Ride](#) program, and the Wisconsin Bike Federation resumed operation of the Dane County Safe Routes to School (SRTS) program in 2021, when the organization hired staff based in Madison again after an absence of several years. The SRTS program is a partnership with the Capitol Area Regional Planning Commission, which has designated the Wisconsin Bike Federation as the organization responsible for this activity within their planning area. The [City of Madison](#) has a full-time Pedestrian and Bicycle Safety Coordinator funded through the MPO, and offers programs to teach children how to bicycle safely and provides resources including “Learn to Ride” web sites in English and Spanish. The Pedestrian and Bicycle Safety Coordinator undertakes direct education, oversees volunteers, and collaborates and partners with the Dane County SRTS program, area non-profits, and the [Healthy Kids Collaborative – Dane County](#) to hold bicycle education events in community and neighborhood centers, schools, parks, and other venues. The Madison Metropolitan School District adopted a [Safe Routes to School Master Plan](#) in 2013. The City of Middleton publishes a [Bicycle Guide](#) that includes basic safety and rules of the road information.

MAPS AND WAYFINDING

The Cities of [Madison](#), [Fitchburg](#), [Middleton](#), [Monona](#), [Sun Prairie](#), and other communities publish local bike maps; additional small-area or route-specific maps, such as those for the [Monona Lake Loop](#) and the [Bombay Bicycle Club Ride Maps](#), are published by area organizations and agencies. The MPO, in partnership with Dane County, publishes the [Dane County Bicycle Map](#) in print and online, which provides information on the bicycle suitability of rural roads and the location of paths and other facilities. The 2020 Dane County Bicycle Map includes both English and Spanish text, making it the first bilingual county-wide bike map in Wisconsin. The MPO also publishes and maintains a variety of online resources including the [Low Traffic Stress \(LTS\) Bike Route Finder](#), [Story Maps](#) of area trails, and a [complete listing](#) of area bike maps. Finally, the Wisconsin Department of Transportation produces bicycle [maps for all counties](#) in Wisconsin.

Historically, shared-use paths and bike routes were named and signed by their controlling jurisdictions. The [Dane County Bicycle Wayfinding Manual](#) establishes standards for marking bicycle routes consistently across jurisdictions, making it easier and more convenient for cyclists to navigate the system. Unfortunately, area communities have been slow to adopt or implement this manual, so consistent wayfinding is not yet available for cross-jurisdictional area routes. In 2019, the MPO updated the project screening criteria for the STBG – Transportation Alternatives

(TA) funding program to include appropriate wayfinding as a project requirement.

BICYCLE USE

Bicycle usage has increased dramatically in the last few decades. The U.S. Census provides reliable commute-to-work bicycle counts that show that about 3.6% of commuters in the Madison Urban Area bike to work, but the number rises to 4.5% in the City of Madison and exceeds 10% in some central Madison Census Tracts.⁷ The increases are largely associated with improved bicycle infrastructure, changing attitudes about transportation and the environment, and parking limitations and cost in central Madison.

Estimating bicycle use for non-commute trips is more difficult. To gather information about travel in the region as a part of the update and improvements to the regional travel forecast model, the MPO conducted a household travel survey in 2016–17, concurrent with the National Household Travel Survey (NHTS). The MPO's survey was designed to largely duplicate the NHTS to increase the sample size in the MPO area, and generate more data about travel behaviors associated with biking and transit, less common modes of travel.

The survey results revealed that just under 4% of all trips in the MPO area were made by



bike.⁸ People living in central Madison made about 10% of their trips by bike compared to people in suburban communities who made just 2% of their trips by bike. 28% of all bike trips were between home and work; home-based trips for social/recreational purposes and trips between non-home locations each accounted for another 21%. The average bike trip was 1.8 miles in length—shorter for people living in the central Madison area, and longer for those living in other parts of the City of Madison and in the suburban communities. While the average distance people biked

⁷ ACS 2019 5-year, Means of Transportation to Work.

⁸ All travel survey data referenced is for weekday trips made entirely within Dane County.

from home to work was nearly 3 miles, the average distance of all other bike trip types ranged from 1.0 to 1.7 miles. These relatively short trip distances highlight the impact of land use on bike travel—people are unlikely to bike to destinations beyond a few miles from their homes.

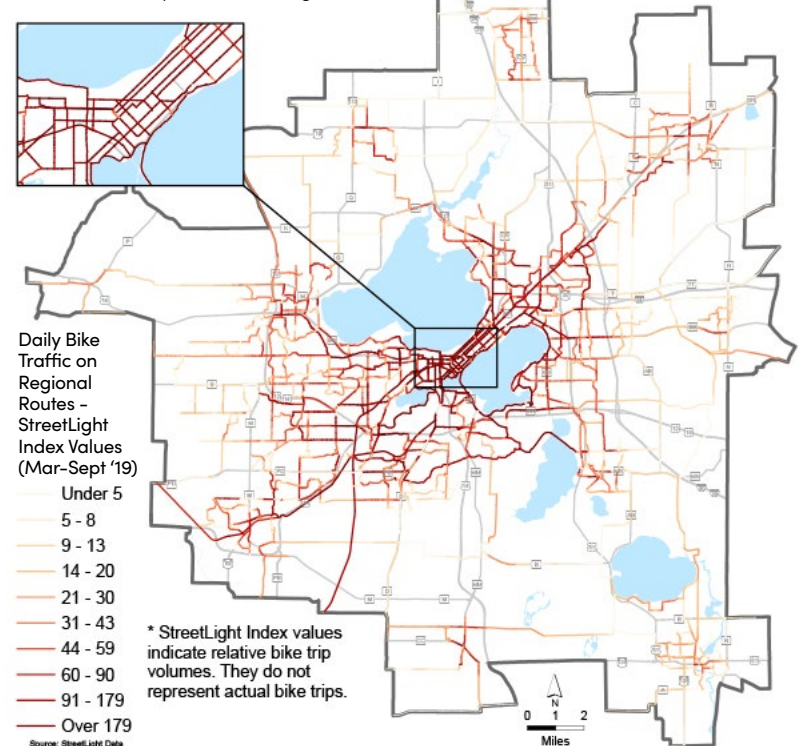
The City of Madison has a number of continuous bicycle-counting devices at various locations spread throughout the city. These show high usage particularly near the UW and on the Southwest Path and Capital City Path. Two Eco-Totem counters log data for reporting and analysis, as well as displaying the daily bicycle count.



The MPO also uses “big data” for insight into bike travel in the region. The MPO contracts with StreetLight Data for access to aggregated travel information based on signals sent to and from smart phones for location-based services—mapping, social media, and other applications that track users’ whereabouts. While this is a valuable data source, the StreetLight platform does not report the estimated actual number of bicycle riders, instead using an “index” that ranks traffic proportionally within the analysis. In attempting to correlate StreetLight Index data with ridership recorded by automatic counters, MPO staff discovered inconsistencies and reporting errors in the automatic counter data that made a direct comparison impossible. MPO and City of Madison staff continue to work to resolve these issues in order to generate more useful bike traffic estimates. MPO staff also coordinate with other area agencies that conduct bicycle and pedestrian counts, including Dane County Parks, UW-Madison, and other communities to compile ridership data from throughout the region.

Bicycle Ridership on Regional Routes

Madison Metropolitan Planning Area



Map 3-s Bicycle Ridership on Regional Routes

While we cannot currently calibrate data from StreetLight with data from bike counters installed in the area, it can still provide a sense of bicycling activity throughout the region. Map 3-s shows the estimated average daily relative volume of bicycle traffic on regional bike routes in the MPO area. The StreetLight Index values shown represent the bicycle traffic on each segment relative to traffic on other segments; they do not represent the estimated average of actual

bicycle trips. Bicycle activity is clearly concentrated in central Madison and on a number of routes radiating out from the central area. Elevated levels of bike traffic are also apparent in each of the smaller communities, most likely due to short in-town trips, such as those to or from schools.

There are some locations where MPO staff believes that the StreetLight Index values shown on the map may be incorrect. Small low-traffic gaps on otherwise higher-traffic corridors are most likely due to errors linking bike trips to the correct route. In addition, StreetLight Index values on routes adjacent to large surface parking lots, such as near East Towne Mall, may be too high due to slow-moving cars in parking lots being incorrectly identified as bikes by StreetLight’s algorithm.

RECOGNITION AND AWARDS

In 2015, six Madison-area communities submitted the first-ever regionally-coordinated applications for [Bicycle Friendly Community](#) (BFC) certification through the League of American Bicyclists. Seven area communities again submitted coordinated applications in the fall of 2019, with two more community applications delayed until spring 2020. The awards earned by these applications⁹ attest to the Madison area’s

⁹ UW – Madison – Platinum Bicycle Friendly University; City of Madison – Platinum BFC; City of Fitchburg – Silver BFC; City of Middleton, City of Monona, City of Sun Prairie, City of Verona, and Dane County (2016) – Bronze BFCs; Village of Oregon – Honorable Mention.



status as one of the United States’ best metropolitan areas to be a bicyclist.

As shown in Figure 3-I, People for Bikes, a national advocacy organization, ranks the City of Madison as the second-best place to ride a bike in North America, with an overall score that is only marginally less than that of top-ranking San Luis Obispo, CA.¹⁰



Pedestrians

EXISTING PEDESTRIAN SYSTEM

Pedestrian facilities are important for a safe transportation system that accommodates all users, since virtually all trips by any mode begin and end with walking. Sidewalks provide a separate facility so that people walking and using mobility devices do not need to walk in traffic. Sidewalks also provide access to public transit, increasing transportation options for those who may not be able to drive. Sidewalks on both sides of the street reduce the number of times pedestrians must cross the street and be exposed to traffic. The City of Madison and other communities have programs that routinely retrofit sidewalks and crosswalks with curb ramps in street corridors that do not have them and repair sidewalks that are broken, heaved, or do not meet modern standards.

¹⁰ <https://cityratings.peopleforbikes.org/all-cities-ratings/> (as of April 28, 2021)

Top 10 Places to Ride a Bike

CITY NAME	STATE	COUNTRY	POPULATION	OVERALL SCORE	RIDERSHIP	SAFETY	NETWORK	REACH	ACCELERATION
San Luis Obispo	CA		47,180	★★★★★ 3.5	7.5	7.5	7.5	7.5	7.5
Madison	WI		252,086	★★★★★ 3.5	7.5	7.5	7.5	7.5	7.5
Toronto	ON		2,731,571	★★★★★ 3.4	7.5	7.5	7.5	7.5	7.5
Boulder	CO		107,360	★★★★★ 3.4	7.5	7.5	7.5	7.5	7.5
Santa Barbara	CA		91,325	★★★★★ 3.3	7.5	7.5	7.5	7.5	7.5
Washington	DC		684,498	★★★★★ 3.2	7.5	7.5	7.5	7.5	7.5
Missoula	MT		72,125	★★★★★ 3.2	7.5	7.5	7.5	7.5	7.5
Rogers	AR		64,947	★★★★★ 3.2	7.5	7.5	7.5	7.5	7.5
Fort Collins	CO		162,511	★★★★★ 3.2	7.5	7.5	7.5	7.5	7.5
Denver	CO		683,417	★★★★★ 3.2	7.5	7.5	7.5	7.5	7.5

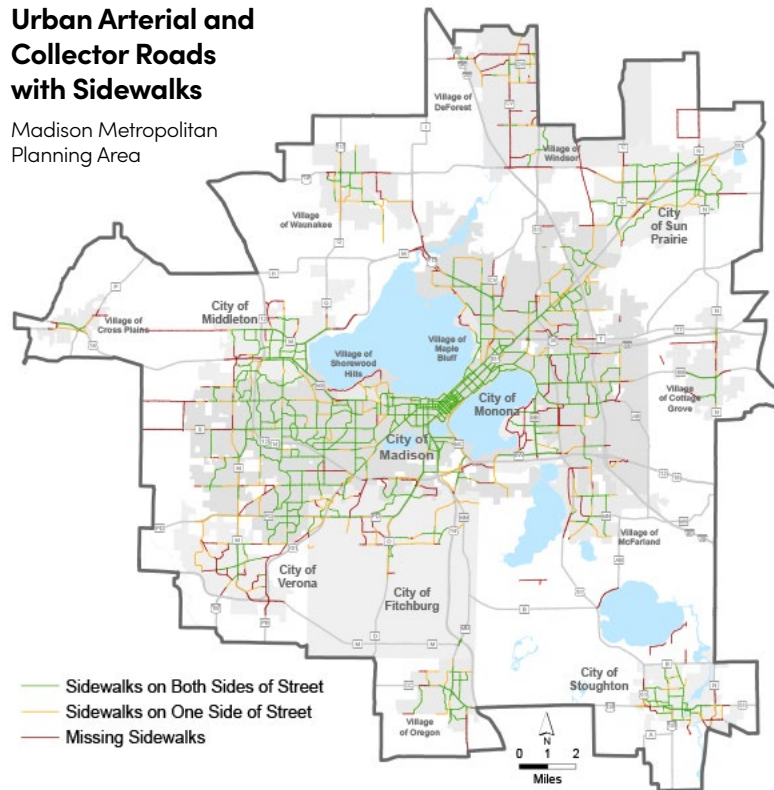
Figure 3-I Top 10 Places to Ride a Bike

All urban streets benefit from sidewalks. They create a healthier community as research has shown people will walk for recreational or other purposes if a facility is provided. Sidewalks, however, are most crucial on urban arterial and collector streets, which have higher traffic speeds and volumes and also serve most destinations like shops, schools, and employment areas. Sidewalks on these streets provide the most safety benefits and also can increase the number of transportation trips made by walking. In addition, shared-use paths are used by pedestrians as an alternative to walking along streets or because they provide shorter paths to destinations.

Intersections represent a special barrier for pedestrians not only because they

Urban Arterial and Collector Roads with Sidewalks

Madison Metropolitan Planning Area



Map 3-t Urban Arterial and Collector Roads with Sidewalks

must cross traffic to continue, but also because traffic is frequently turning and drivers may be focusing on several things at once. Motor vehicle traffic is required to yield to pedestrians at most unsignalized intersections, but compliance is limited.

SIDEWALK COVERAGE

The MPO maintains a countywide sidewalk database in order to track sidewalk coverage. The database contains information on whether each public road has a sidewalk or

shared-use path on both sides, one side, or no sidewalk at all. It further tracks whether streets are primarily urban or rural (sidewalks are not normally installed on rural roads) and whether or not sidewalk is expected due to development along the street and in the area and other factors. Sidewalks are not expected along freeways, ramps, alleys, or in parking lots.

In the metropolitan planning area, about 50% of urban streets have sidewalks on both sides, with an additional 15% having sidewalks on one side. Sidewalk coverage in the City of Madison is substantially greater, with 88% of streets equipped with sidewalks on at least one side. Among urban arterial and collector roads in the area, shown on Map 3-t,

54% have sidewalks on both sides and an additional 23% have sidewalks on one side.

THE CHALLENGES AND TRADE-OFFS WITH RETROFITTING SIDEWALKS IN DEVELOPED AREAS

Although sidewalks are normally included in new construction in most jurisdictions, installing sidewalks along streets in established neighborhoods is often met with local opposition. Residents may be concerned



about several issues, including assessments for sidewalk installation, the need to clear snow and ice in the winter, and the loss of yard area and landscaping.

While policies regarding snow and ice clearance are similar across communities in the Madison metropolitan area, policies regarding funding for sidewalk installations in existing neighborhoods vary widely. Some require property owners to pay the entire cost, others fund the entire cost publicly, and some split the cost of new sidewalk construction 50/50 with adjacent owners.

City of Madison residents are charged a special assessment for 100% of the cost of

sidewalk installation and 50% of the cost for repair. Beginning in 2015, the city has offered a program to reduce the burden of these assessments on low-income residents.

The MPO published [*Pedestrian and Bicycle Facility Requirements, Policies, and Street Standards*](#) in 2021, which details the current assessment policies of area communities and discusses the equity ramifications of sidewalk funding policies.

INTERSECTION TREATMENTS

A variety of intersection treatments are used in the U.S. as well as in the Madison area to make intersections safer for pedestrians.

- **Marked crosswalks** – Legal crosswalks can be either marked or unmarked. Well-marked crosswalks are easier for drivers and pedestrians to see.
- **Rectangular Rapid Flashing Beacons (RRFB)** – Yellow LED lights may be installed with signs at crosswalks at non-signalized intersections to alert drivers of pedestrian(s) crossing the street. The beacons are activated by a pedestrian pressing a button. Vehicles should stop, and may proceed when the crosswalk is clear.
- **Pedestrian hybrid beacons / High-intensity Activated crossWALK beacon (HAWK)** – Special traffic beacons at an intersection that does not warrant full signalization. Solid red lights require vehicles to come to a complete stop; a flashing light cycle indicates that

drivers may proceed with caution if no pedestrians are present. The beacons are activated when a pedestrian presses a button.

- **Median refuge islands** – Refuges can shorten distance needed to cross an intersection and allow a pedestrian to make a multi-stage crossing. Refuges should be wide enough to safely accommodate several pedestrians, or expected bicycle and pedestrian traffic as appropriate. Especially on higher-speed roadways, refuges should include bollards or other physical barriers between traffic and people waiting on the refuge.
- **Curb extensions** – Intersection treatments designed to shorten the effective crossing distance for pedestrians. These are appropriate on blocks with on-street parking, but may interfere with bus and bike lanes.
- **Wayfinding signage** – In dense commercial areas like downtowns and campuses, wayfinding tools like maps can be valuable for people who are unfamiliar with the area. Signage indicating routes and distances to destinations are appropriate at intersections of major pedestrian routes in both rural and urban settings.

STREET NETWORK CONNECTIVITY

Besides high quality pedestrian facilities, pedestrians need a dense network of streets. Since people only walk at a speed of a few miles per hour, any out-of-direction travel is

an impediment to walking. Downtown grid systems with short blocks and dense street networks common in cities developed prior to the advent of automobiles or even public transit are ideal for walking.

Intersection density is one indicator of pedestrian network connectivity. Generally, a higher number of intersections is correlated with shorter blocks and easier navigation. Linear barriers, such as water features, freeways, and railroads also present impediments to walking.

The MPO's *Pedestrian and Bicycle Facility Requirements, Policies, and Street Standards* report includes block size requirements established by area communities, as well as national best practices and recommendations on block size. Notably, nearly all area communities require minimum block sizes (400–600 feet) that are nearly equal to the maximum block size recommendations established by the Institute of Transportation Engineers (less than 400 feet desired, 660 feet maximum). Reducing or even eliminating minimum block sizes and adopting smaller maximum block size limits would result in the development of more walkable neighborhoods.

While central Madison's dense street network and small blocks make it well suited to travel by foot, limited-access highways, as well as some rail lines and major roadways, present challenges for connecting neighborhoods on Madison's periphery, as shown in Map 3-u. In many locations, new or improved pedestrian connections across these barriers are needed.

Deficient pedestrian barrier crossings may be improved by adding pedestrian facilities or safety improvements, and by linking barrier crossings with the existing pedestrian network.

BICYCLE AND PEDESTRIAN CRASH STUDY

In the 2018 [*Dane County Bicycle and Pedestrian Crash Study*](#), the MPO identified common features of crashes in which

pedestrians were struck by motor vehicles and set a benchmark for future safety performance measurement in the Madison metropolitan area and Dane County.

During the study period of 2011–2015, there were 552 documented motor vehicle crashes involving pedestrians, 23 (4%) of which were fatal and 79 (14.3%) were classified as “incapacitating.” The rate of fatalities and

incapacitating injuries resulting from these crashes is far higher than from motor vehicle crashes involving bicyclists. Speed was highly correlated with injury severity, with 14 of 23 crashes (61%) occurring on roads with speed limits of at least 35 mph, despite these roads accounting for less than 20% of reported pedestrian crashes. While the majority of crashes were in central Madison, fatal crashes were more widely distributed. Most crashes occurred at an intersection, and in about 60 percent of cases the pedestrian was in a legal crosswalk.

Drivers received citations in 49% of these crashes, pedestrians were cited in about 10%, and 1% of crashes resulted in citations for both drivers and pedestrians. In 40% of the crashes, no citations were issued.



Transportation Demand Management and Ridesharing

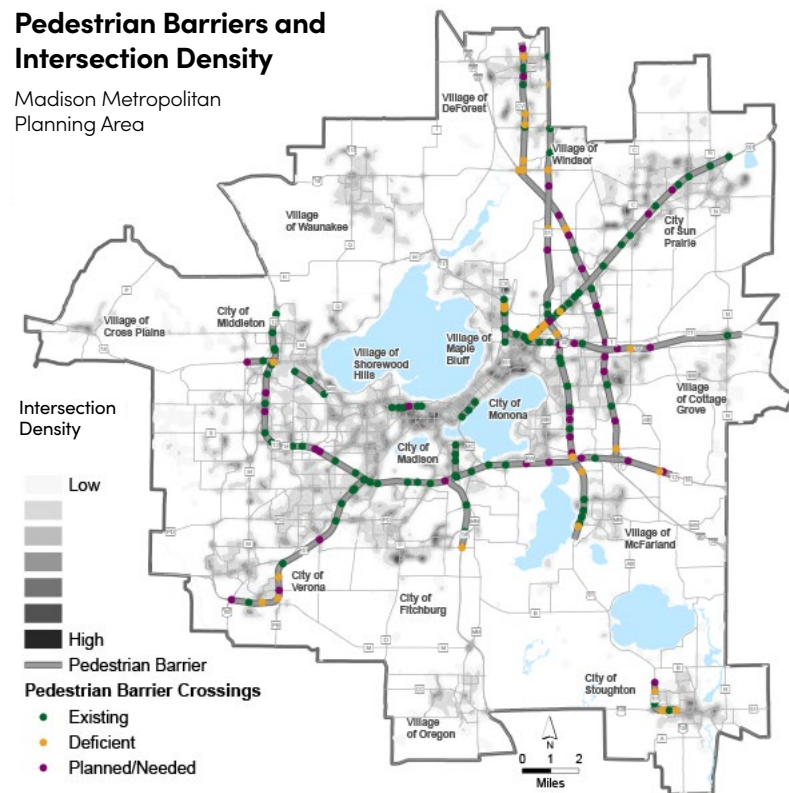
TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is generally defined as a set of strategies to reduce roadway congestion, vehicle miles traveled, and demand for single-occupancy vehicle (SOV) use by redistributing demand to alternative travel modes, times, and routes. TDM is implemented through land use policies that support compact, mixed-use development; transportation policies that support safe, connected, multimodal systems; financial incentives such as discounted transit passes and priced parking that influence demand; and public and private sector programs that use education and encouragement to promote behavior change.

TDM programs that are administered by public and nonprofit entities and applied beyond a single workplace, such as at a district, municipal, or regional scale, have traditionally focused on commuter-based incentives and activities that promote carpooling, vanpooling, public transit and telework, as well as employer-based incentives and marketing aimed at reducing drive-alone commute trips. Today, these programs also promote active transportation such as bicycling and walking, and support

Pedestrian Barriers and Intersection Density

Madison Metropolitan Planning Area



Map 3-u Pedestrian Barriers and Intersection Density. Pedestrian barriers are railroad tracks and major roadways that significantly inhibit pedestrian travel. Barrier crossings are paths, crosswalks, or roads that enable pedestrian access. Deficient crossings lack adequate safety features or pedestrian facilities, or do not provide sufficient connectivity.

transportation behavior change for trips beyond the commute.

While TDM involves all modes of non-SOV transportation, this section focuses on ridesharing services, shared mobility options, and incentive and encouragement programs in the Madison region. See other sections in this chapter for more on walking, bicycling, and public transit.

RIDESHARING AND SHARED MOBILITY SERVICES

There are multiple programs and services that support ridesharing and shared mobility in the Madison area. Both of these transportation types contribute to reducing single-occupancy vehicle trips and personal vehicle ownership, leading to fewer vehicle miles traveled and less demand for roadway and parking infrastructure.

RoundTrip Program

The MPO administers the RoundTrip rideshare program in partnership with the Wisconsin Department of Transportation's RIDESHARE etc. program. RIDESHARE etc. serves commuters statewide and RoundTrip serves commuters in Dane County. Prior to 2021, both programs shared the RIDESHARE etc. name and website; in August 2021, the MPO launched RoundTrip as a unique brand with a dedicated website serving employers and individuals in Dane County.

The RoundTrip program mission is to connect individuals, businesses and organizations



in the Madison region with convenient alternatives to driving alone. The purpose is to reduce vehicle miles traveled and congestion, and improve regional quality of life, by connecting commuters and employers with non-SOV travel options and incentives. The RoundTrip website, www.RoundTripGreaterMadison.org, shares a statewide ride-matching platform with RIDESHARE etc. that allows commuters to search for carpool partners, state vanpool routes, Metro Transit routes, bike buddies, and park-n-rides based on their preferences. The site also provides employer resources; digital sign-up and voucher delivery for the Emergency Ride Home (ERH) program; and a clearinghouse of links to transportation services in Dane County.

On average, hundreds of commuters in Dane County register with RoundTrip annually to search for commute matches and participate in the ERH program. The number of annual

registrations fluctuates based on changing incentives, gas prices, and exceptional circumstances such as the COVID-19 pandemic. In 2021, 244 new commuters registered and there were 2,819 participants in Dane County. Of these, 1,116 were active for matching and 1,483 were registered for ERH. Also in 2021, 871 matches were attempted by participants looking for a carpool, vanpool, bike buddy, transit route, or park and ride, and 565 of these received at least one match. Ridesharing arrangements that form outside of the RoundTrip program are not captured in these statistics. According to 2019 Census American Community Survey 5-year data, approximately 7.3% of workers 16 years and over in Dane County commute by car- or vanpool.



State Vanpool Program

The Wisconsin Department of Administration (WisDOA) operates the only publicly operated commuter vanpool program in Dane County. The program primarily serves commuters traveling to downtown Madison and the UW campus from communities outside

of Madison. The vanpools are groups of 8-15 commuters traveling in vans owned and insured by the program and driven by participants. Participants share costs and pay a bi-weekly fare that covers gas, insurance,

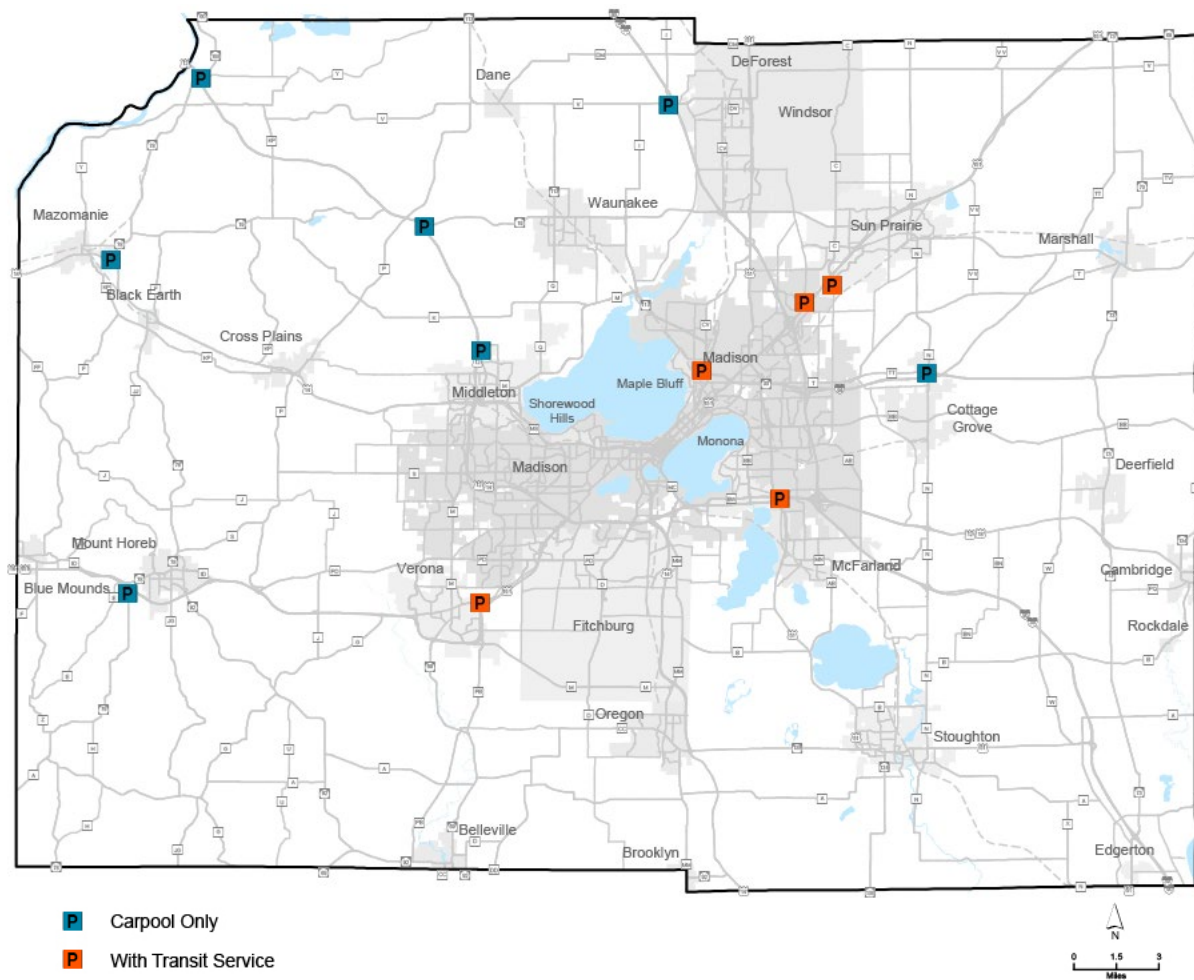
and maintenance. Non-state employees may participate, however there must be at least one state employee assigned to each van.

Prior to the start of the coronavirus pandemic in March 2020, the program operated fifty

routes with just over 500 riders. At the end of 2021, the majority of these routes were paused due to low or no ridership, and the program was operating nine routes with seventy-four riders. Paused routes remain available for matching in RoundTrip and will be resumed with sufficient interest.

Existing Park and Ride Lots

Dane County, Wisconsin



Map 3-v Existing Park and Ride Lots

Park and Ride Lots

There are twelve formal park and ride lots in Dane County, five of which are served by Metro Transit (see Map 3-v). Nine are operated by WisDOT; one is jointly operated by WisDOT in partnership with the Wisconsin DNR and Dane County; two are operated by Metro Transit; and one is operated by the City of Sun Prairie. With the planned implementation of bus rapid transit (BRT) and the related transit network redesign in Madison in 2023-2024, the existing North Transfer Point park and ride is proposed to be removed, and a new lot is anticipated on the west end of the BRT line.

There are also many informal park-and-ride locations distributed throughout the region, concentrated along major Metro Transit corridors. These include locations such as neighborhood streets and commercial parking lots.

YW Transit JobRide Program

In addition to other public transit options including fixed route, specialized transit, and shared ride taxis, the JobRide program operated by YW Transit provides rides



for low-income commuters to areas that are inaccessible during non-peak public transportation hours, including nights, weekends, and holidays. For more information on other public transit services in the Madison area, including additional services provided by YW Transit, see the Public Transit section in the chapter.

Car Share

Car sharing allows people to access shared cars at a variety of locations for short periods of time. Car sharing makes it easier for people to get by with fewer cars or go car-free, helping members save money while retaining access to a car when they need one.



Car sharing also provides members with the flexibility to access different types of vehicles depending on need. In Madison, car sharing is provided by ZipCar, with 25 locations and 43 vehicles throughout the UW-Madison campus and downtown Madison.

Bike Share

Bike share allows users to check out a bicycle at any station in the network, ride to their destination, and park at the closest station. Bike share supports TDM by making it easier for people to make short trips by bicycle, and increasing accessibility by providing an alternative to bicycle ownership.

The City of Madison partners with Trek Bicycles to make bike share available through the Madison BCycle program. Madison BCycle launched in 2011 and recently became the first system in the country to convert entirely to e-bikes. BCycle stations were originally concentrated on the UW campus and in downtown Madison, and have since expanded beyond these areas, including to the first two stations outside of Madison in 2021.

Madison BCycle offers a Corporate Program that allows businesses to subsidize annual memberships for employees and purchase discounted day passes for guests. UW-Madison and Madison College students and staff, and staff of UW Extension and UW Health, are all eligible for discounted annual passes. In 2021, BCycle launched a free Community Pass Program to increase



accessibility for low-income and unbanked individuals. For more information on the Madison-area BCycle system, see the Bicycle section in this chapter.

INCENTIVE & ENCOURAGEMENT PROGRAMS

Successful TDM relies on a mix of incentive and encouragement programs to raise public awareness and increase the use of alternatives to driving alone. Incentive programs with a financial component are particularly effective at promoting behavior change. Several existing programs are implemented by public entities for the Madison area as a whole, while others are implemented by private employers for their employees.

Emergency Ride Home Program

The Emergency Ride Home (ERH) program is funded by the Dane County Highway Department and administered by the MPO through RoundTrip. It supports commuters who work in Dane County by providing up

to six taxi vouchers per year, for use in an emergency when participants are at work without a personal vehicle. The vouchers are good for up to \$75 per ride in order cover rides to anywhere in Dane County. The current annual budget is \$2,000.

At the end of 2021, the ERH program had 1,483 registered participants and had averaged 52 rides per year since 2017. As part of the RoundTrip website launch in August 2021, the MPO introduced digital ERH sign up and voucher requests, which replaced the original manual process with paper vouchers, and made ERH easier to access and less costly to administer.

Metro Transit Commute Card & Discounted Pass Programs

Metro Transit offers multiple discounted pass programs to encourage commuting by public transit. These include the unlimited ride Commute Card program for area employers; discounted 31-day and 10-ride cards; and unlimited ride pass programs with local institutions.



The Commute Card program is open to employers of any size and offers unlimited ride annual passes at a discounted rate, capped at \$65.00 per month. Employers can choose to pay the entire cost; share the cost with employees; or allow employees pay for their own rides with pre-tax dollars. Prior to the coronavirus pandemic in 2020, the Commute Card program had 122 employer participants of a variety of sizes. Participation dipped to 79 businesses in late 2021, due in part to business shutdowns and increased telework during the pandemic.

In addition to the Commute Card, Metro Transit operates unlimited ride pass programs for the City of Madison, Dane County, Edgewood College, Madison College, UW-Madison, and Meriter and St. Mary's hospitals. These employers subsidize all or most of the cost for their riders.

RoundTrip Program Marketing

The MPO collaborates with Metro Transit, UW-Madison Transportation Services, and Dane County to run a jointly-funded annual advertising campaign. The campaign raises awareness of the RoundTrip program and local transportation options through a variety of media.

The MPO also conducts outreach to employers and organizations through RoundTrip and publishes a quarterly e-newsletter for employer contacts. In 2021, the MPO used insights from the pandemic to produce a TeleWORKS Toolkit for employers to



encourage telework as a strategy to reduce drive-alone commutes, and partnered with Sustain Dane and the Dane County Office of Energy and Climate Change to conduct additional engagement on this topic.

Bicycling Promotion

Many efforts in the Madison area focus on bicycle promotion and the presence of local advocacy groups is expanding throughout the region. Many communities participate in the Wisconsin Bike Federation's Bike Week, which is held annually in June and expands upon National Bike to Work Day held in May. In Madison, Bike Week is led by Madison Bikes.

In 2021, the Madison Bicycle Center (MBC) opened in downtown Madison through a partnership between the city and local non-profit Madison Freewheel Bike Co. The MBC provides state-of-the-art support for commuter bicycling and offers used bikes for sale; repair services; day passes and

11 DAYS TO GO!

Check out **all the amazingness** we've achieved together so far:

597 riders from 54 workplaces have logged a ride

= 4,445 trips logged

= 53,898 miles ridden

= 5,082 lbs. CO2 saved



LOVE TO RIDE
MADISON

BIKE MONTH

LET'S RIDE!



memberships with access to secure storage; showers; a bike wash station; and more.

When funding is available, the MPO sponsors bicycle challenges on the Love to Ride platform, which specializes in applying behavior change strategies to promoting bicycling for transportation worldwide. These month-long challenges encourage riders of all levels to bike more often using tailored messaging, social engagement, teams, and prizes. Following each challenge, Love to Ride provides detailed metrics that can be used to inform future challenges and initiatives. Love to Ride Madison challenges have been held in 2015, 2016, 2020, and 2021.

Safe Routes to School

The Safe Routes to School (SRTS) movement encourages parents and children to

walk and bike to school, to increase physical activity and reduce the safety issues associated with driving. A coordinated county-wide SRTS program began in 2017, supported with Federal Transportation Alternatives Program funding awarded by the MPO. Originally led by Healthy Kids Collaborative (UW Health), the program is currently administered by the Bicycle Federation of Wisconsin.

UW-Madison Commuter Solutions Program

As the largest employer in Dane County and largest landowner in central Madison, the commute habits of UW employees have a significant impact on the transportation system. The UW Department of Transportation Services operates a comprehensive Commuter Solutions program for faculty, staff, and students that supports alternatives to driving alone in the following ways:

- **Best Workplace for Commuters, 2022:** This designation recognizes UW-Madison's efforts to promote environmentally friendly commuting by encouraging multi-modal transportation and alternatives to reduce stress and traffic congestion.
- **Personalized Route Planning:** Individual outreach and an online form that allows faculty, staff and students to request route planning information customized to their schedule, location and interests.
- **Transit:** Free campus bus service and deeply subsidized Metro Transit passes for most UW-Madison faculty and staff and UW Health employees. Students are eligible for free passes funded via student segregated fees.
- **Carpooling:** Six complimentary daily parking passes per year and access to an Emergency Ride Home program for registered carpool members.
- **Emergency Ride Home:** Up to three ERH vouchers every six months for employees who choose an alternative to driving alone to campus.
- **Park and Rides:** Low-cost permits at two university lots, with shuttle service to locations throughout campus.
- **Flex Parking:** Occasional parking for commuter who typically use alternate modes. Flex Parking represents about 10% of available permits and regularly has a waitlist.
- **Bicycling:** The UW-Madison is a Platinum level Bicycle Friendly University. There are over 15,000 bicycle parking stalls on campus, including secure bike lockers and cages. UW will have thirteen BCycle stations installed by summer of 2022. The UW Bicycle Resource Center offers free use of tools, and classes for students and employees.



Inter-Regional Travel

INTER-CITY BUS SERVICE

A handful of private inter-city bus companies provide regularly-scheduled bus service open to the public between Madison and major destinations like Milwaukee, Chicago, and Minneapolis/St Paul as well as other cities and points in the region. Prior to the COVID-19 pandemic, Badger Bus provided eight round trips per day to Milwaukee with stops in Johnson Creek and Waukesha; these services have been suspended, with Badger Bus currently only offering the seasonal campus trips described below. Van Galder (Coach USA) provides 12 round trips daily to Chicago with stops in Janesville, Beloit, and Rockford. Megabus (Coach USA) and Greyhound both provide one daily express round trip between Chicago and Minneapolis/St Paul with a stop in Madison; prior to the COVID pandemic both operators offered multiple daily trips on these routes. FlixBus, a relative newcomer to the U.S. intercity bus market,¹¹ offers service to Minneapolis and Chicago five days a week.

Lower-volume routes connect smaller cities. Lamers provides daily service on routes between Madison and Dubuque, Green Bay, Appleton, Milwaukee, and Wisconsin Rapids. Jefferson Lines serves Madison and La Crosse on its Milwaukee to Minneapolis route. Operation of these services is partially supported by Wisconsin state intercity bus grants, and federal Section 5311 funding

¹¹ Founded in Germany in 2013, initiated Madison service in 2021, and acquired Greyhound in October 2021.

supports capital purchases for Jefferson and Lamers Bus Lines. Seasonal limited service between Madison and Whitewater, Eau Claire, and La Crosse/Minneapolis operated by Badger Bus is designed around college and university student weekend travel with two trips each on Friday and Sunday.

Map 3-w shows inter-city bus stop locations in the Madison area.

Ridership data is not generally available from intercity bus companies, and only Jefferson Lines provided requested ridership numbers for this plan update. Jefferson Lines reports approximately 3,800 total annual 2019 combined boardings and alightings in Madison, with the most popular trips being those between Madison and La Crosse, the Twin Cities, Rochester, Winona, and connections to interlined bus networks in locations outside of Wisconsin.

Jefferson operates approximately 1 in 20 inter-city buses that serve Madison. If their buses are, on average, at the same percentage of capacity as other lines they are carrying approximately 5% of the total inter-city ridership. This means that total inter-city annual ridership would appear to be in the neighborhood of 76,000 trips, or 208 trips daily. Given that these trips are bound for or arriving from nearly every direction, it is unlikely that inter-city buses currently have any impact on congestion through reducing private automobile traffic. Ridership would need to increase by one if not two orders of magnitude in order for these services to have



a noticeable impact traffic congestion on any particular roadway or corridor.

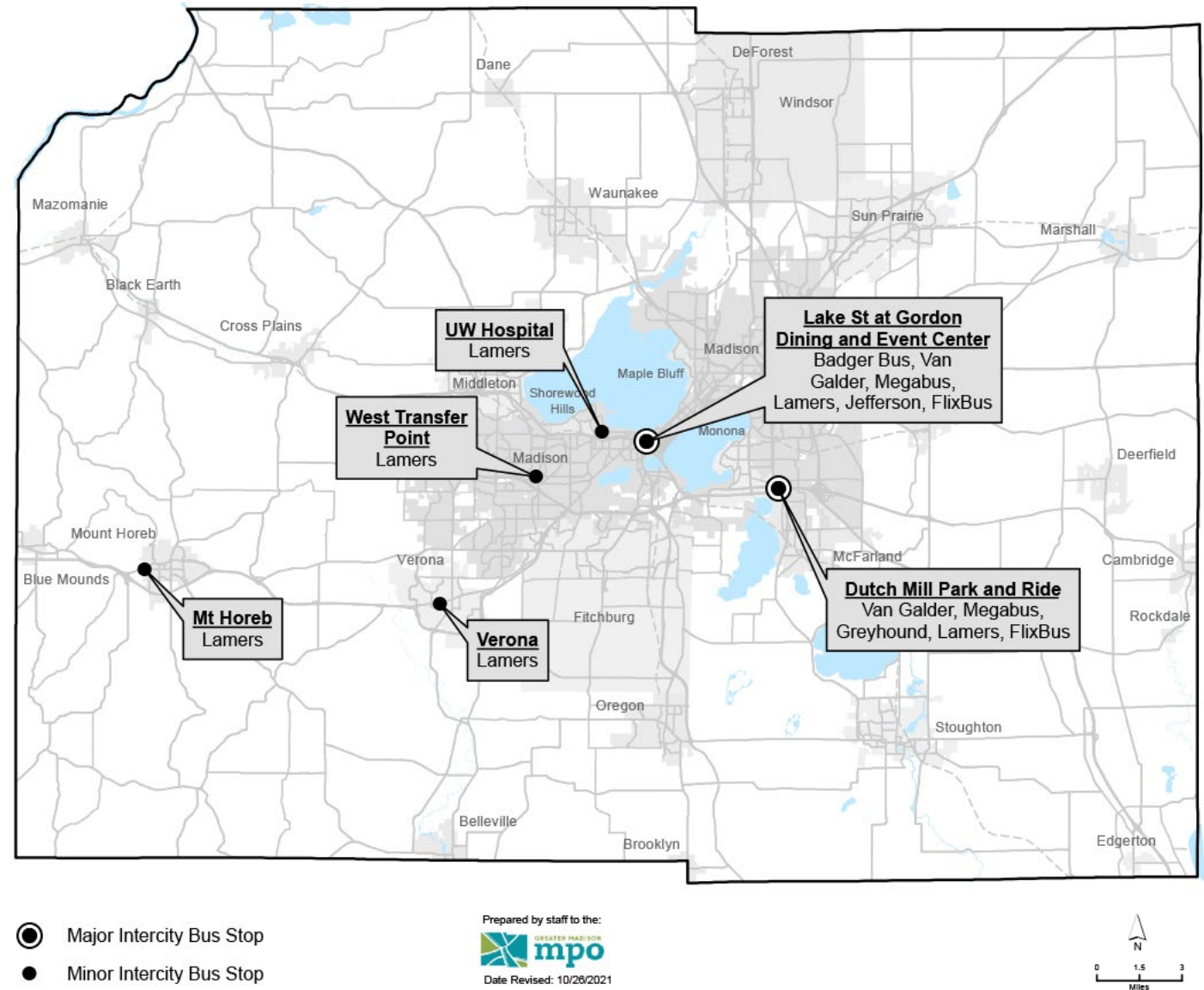
Investment in high-quality facilities for inter-city bus travelers could help boost ridership, so it is conceivable that congestion could be impacted by these services by 2050 – particularly in specific corridors or areas like the UW campus where so many trips begin or end. Ironically, inter-city buses and related pick-up/drop-off traffic appear to cause congestion at the current UW Lake Street stop location; this problem should be at least partly ameliorated by the planned Lake St. inter-city bus terminal.

Based on the shortest trip distance to any of those destinations from Madison (La Crosse, at 142 miles), the 3,800 annual trips made to or from Madison on Jefferson Lines alone prevent the release of over 500,000 lbs. of CO₂ annually, compared to making those trips in single occupant vehicles.¹² Given that the majority of destinations served by Jefferson Lines are farther from Madison than La Crosse is, the actual reduction in CO₂ emissions resulting through use of inter-city bus service is much higher than this conservative estimate. Although the larger bus companies did not provide ridership numbers for this plan, Jefferson Lines operates approximately one in 20 inter-city buses serving Madison, and most destinations served by inter-city buses are further from Madison than La Crosse is. Accordingly, a rough and highly conservative estimate of CO₂ emissions reductions from the use of inter-city buses is that at least 10,000,000 lbs. (over 4,500 metric tons) of

¹² Stanford University Commute Cost & Carbon Emissions Calculator <https://transportation-forms.stanford.edu/cost/>

Intercity Bus Stops

Dane County, Wisconsin



Map 3-w Intercity Bus Stops

additional CO₂ would be released annually if all those trips were made by SOV.

Assuming that the 3,800 annual riders of Jefferson Lines are 1/20th, or 5% of all inter-city passengers, 76,000 one-way trips are made into or out of Madison annually on inter-city buses. Once again basing overall estimates on the conservative trip length of 142 miles, and given that approximately 6.8 gallons of fuel would be burned by the average vehicle while making that trip¹³, over 500,000 gallons of gasoline are saved annually through inter-city bus ridership in the Madison area.

The combined direct (gas, parking, & tolls) and indirect (insurance, maintenance, etc.) cost of operating a private vehicle for the 142-mile trip to La Crosse is estimated at \$103.19.¹⁴ These costs do not include the cost of the vehicle itself. A one-way ticket for this trip costs between \$22 and \$31, depending on the bus company and desired day of travel.¹⁵ Assuming that all inter-city bus tickets cost just \$22 (the low end of ticket prices to one of the closest possible destinations), the estimated 76,000 passengers of inter-city bus service to and from Madison save over \$6 million annually by not making those trips in private automobiles. The public does subsidize some inter-city bus services through the federal Section 5311 Program; for 2022-2026, this annual support amounts to under \$1.5 million for area routes.¹⁶

¹³ *ibid*

¹⁴ *Ibid*

¹⁵ On-line price search conducted September 10, 2021

¹⁶ [Greater Madison MPO 2022-2026 Transportation Improvement Program](#)

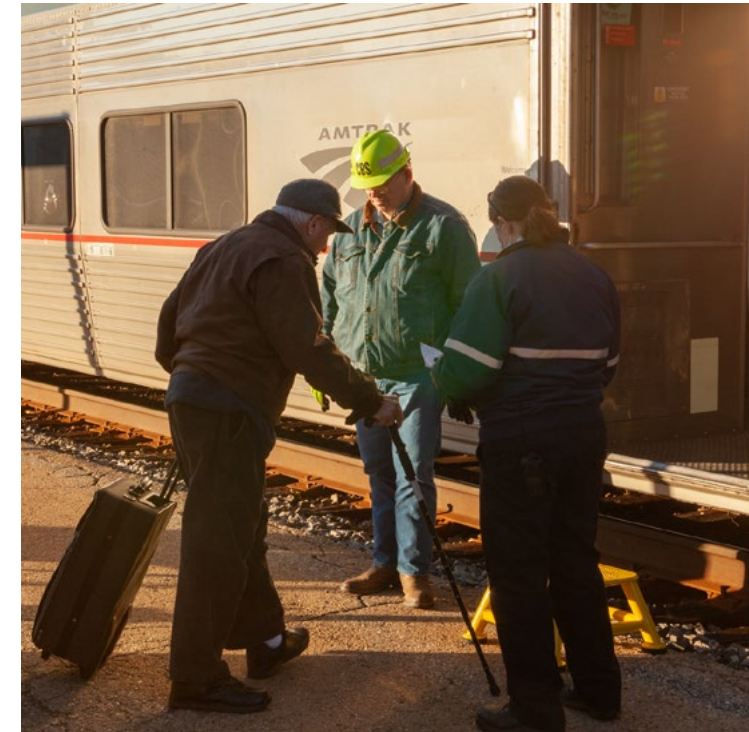
Although inter-city bus services do not currently have a measurable impact on traffic congestion on the routes they travel, it is clear that they do have positive impacts on emissions and air quality, as well as reducing fossil-fuel use and traveler costs.¹⁷

PASSENGER RAIL SERVICE

The nearest passenger rail station with regular public service is the Amtrak station in Columbus, Wisconsin about 26 miles northeast of downtown Madison. This station serves Amtrak's daily long-distance Empire Builder route serving Chicago, Milwaukee, Minneapolis/St. Paul, Seattle, Portland, and other cities with departures three days a week. Access to Empire Builder trains is limited by stop locations – which include Portage and Wisconsin Dells – and schedules of inter-regional bus operators serving La Crosse and Columbus.

Amtrak also coordinates with inter-regional bus companies and sells integrated tickets on their Thruway Bus service. Thruway bus service allows passengers to buy a single ticket that includes travel on Amtrak's rail service and certain connecting bus routes. Amtrak's national network includes a central

¹⁷ Per [23 CFR 450.324\(f\)\(8\)](#), MPOs need to consider "the role that intercity buses may play in reducing congestion, pollution, and energy consumption in a cost-effective manner and strategies and investments that preserve and enhance intercity bus systems, including systems that are privately owned and operated, and including transportation alternatives, as defined in 23 U.S.C. 101(a), and associated transit improvements, as described in 49 U.S.C. 5302(a), as appropriate."

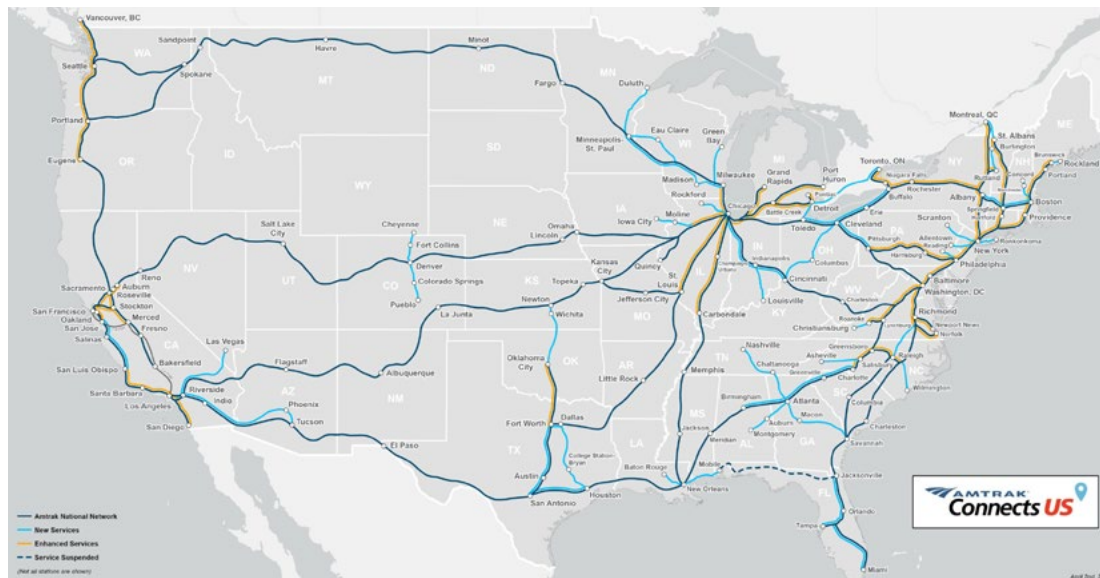


hub in Chicago, which, along with Van Galder's Madison-to-Chicago bus service, allows convenient rail travel to many major destinations around the U.S.

In addition to its long-distance service with trains generally running daily on routes longer than 750 miles, Amtrak offers more frequent service on shorter state-supported lines. The Hiawatha Service between Chicago and Milwaukee is one of Amtrak's more successful state-supported routes with about seven daily round trips and 876,356 passenger boardings in 2019.¹⁸ Due to the Coronavirus

¹⁸ <https://wisconsindot.gov/Pages/projects/multimodal/rail-chi-mil/facts.aspx>

Amtrak Connects US



Map 3-x Amtrak Connects US

pandemic, only four northbound and three southbound trips are currently offered on a daily basis. Planned improvements to the Hiawatha Service include improving frequency to ten round trips per day and increasing train speeds to up to 90 miles per hour. In the 2000s, the Wisconsin Department of Transportation led an effort to extend the Hiawatha Service line to Madison with improved tracks and a station near the Monona Terrace. The project was cancelled in 2010. WisDOT is currently engaged in the Wisconsin Rail Plan 2050 planning process, scheduled to be completed by summer 2022.¹⁹

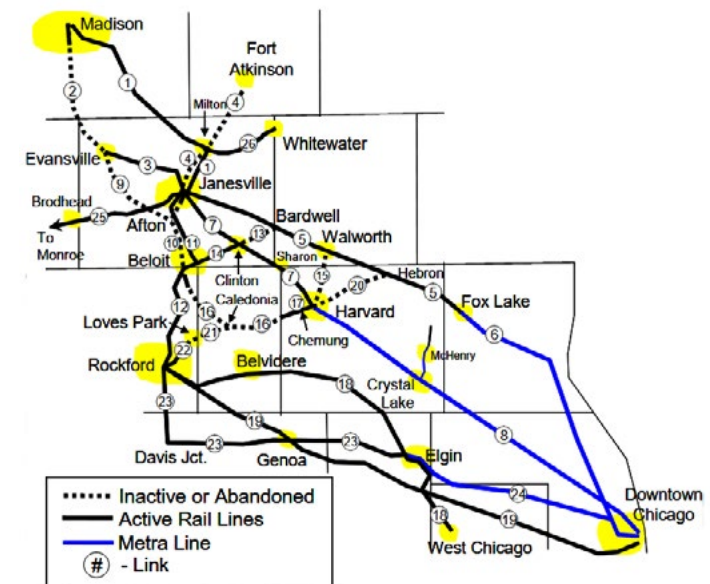
¹⁹ <https://wisconsindot.gov/Pages/projects/multimodal/railplan/default.aspx>

The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), signed into law in November 2021 includes \$66 billion for rail nation-wide, and Amtrak's Connects US plan (see Map 3-x) proposes new service connecting Madison directly to Milwaukee and Minneapolis/St. Paul. Funding for planning a station location was included in the City of Madison's 2022 Capital Budget.

The Stateline Area Transportation Study (SLATS), the MPO for the Beloit metro area, conducted a Passenger Rail Study²⁰ in 2021 that advanced two Study Alignments for

²⁰ http://gouda.beloitwi.gov/webink/0/edoc/74275/SLATS%20Passenger%20Rail%20Study_FINAL%20REPORT_Feb%202021.pdf

SCWCTS Candidate Rail Corridor Links



Source: SCWCTS, 2008.

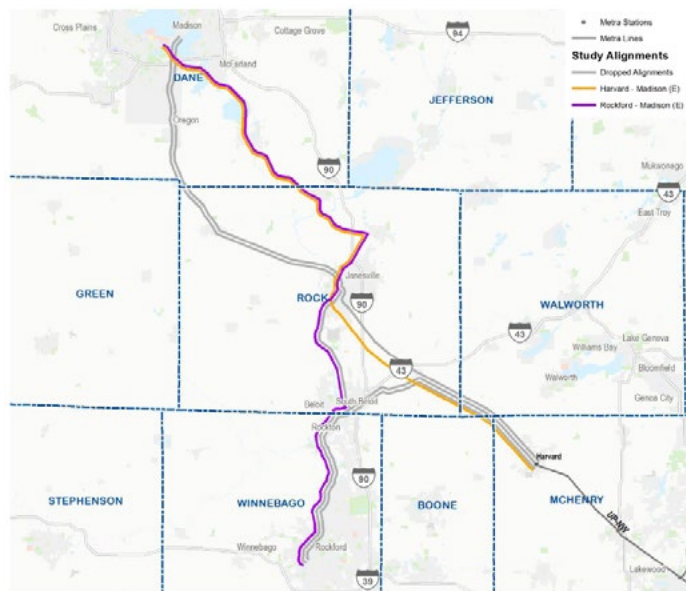
Map 3-y SCWCTS Candidate Rail Corridor Links

further study: Rockford-Beloit-Janesville-Milton-Madison, labeled as Rockford-Madison (E); and, Harvard-Janesville-Milton-Madison, labeled as Harvard-Madison (E) in map 3-z

The Midwest Regional Rail Plan (MWRRP),²¹ released in October 2021, recommends that the Chicago to Twin Cities Core Express route serve Madison directly. Notably, the MWRRP states that "Milwaukee and Madison were determined to be significant markets critical to the operational viability of a Core Express corridor between Chicago and Minneapolis-

²¹ <https://railroads.dot.gov/sites/fra.dot.gov/files/2021-10/Final%20Report-MWRRP%20with%20Appendices%20PDFa.pdf>

Study Alignments to Advance



Source: AECOM.

Map 3-z Study Alignments to Advance

St. Paul and should be included on any mainline route alignment.”²² The MWRRP recommends that the Minneapolis–St. Paul – Chicago “Core Express” service be routed via Milwaukee and Madison, and notes that there are no outstanding issues with this configuration.²³ The MWRRP Fig. 26, a concept of the recommended routing, is reproduced in this plan as Figure 3-m.

INTER-CITY BUS TERMINAL

Inter-city buses stop in a variety of places in Madison but most serve a stop on North

Lake Street on the UW campus. Greyhound is an exception, only serving the Dutch Mill park-and-ride on Madison's southeast side. Inter-city bus passengers currently do not have a terminal to use with direct access to bathrooms, information, or climate control. The lack of an inter-city transit terminal is not consistent with the level of inter-city bus service in Madison. The need for a new terminal has been felt since Badger Bus closed their terminal on Bedford Street in 2009.

Various sites for an inter-city terminal have been investigated, including a rail terminal near the Monona Terrace, a parcel on Bedford Street, and a terminal integrated into the reconstructed Lake Street parking garage. The City of Madison began

the RFP process for a new public parking structure, intercity bus terminal, first floor retail, and housing on the Lake Street site (Figure 3-n) in late 2020, but due to budget constraints related to the pandemic the project was postponed until 2021. Seven proposals were received for the project, with selection of the preferred proposal anticipated in 2022 and construction beginning in the first half of 2025.²⁴ Project goals include providing a high quality facility that serves all the inter-city bus lines with

22 p 48

²³ Table 9

²⁴ <https://www.cityofmadison.com/dpced/economicdevelopment/state-street-campus-garage-mixed-use-project/3643/>

MWRRP Recommended Routing

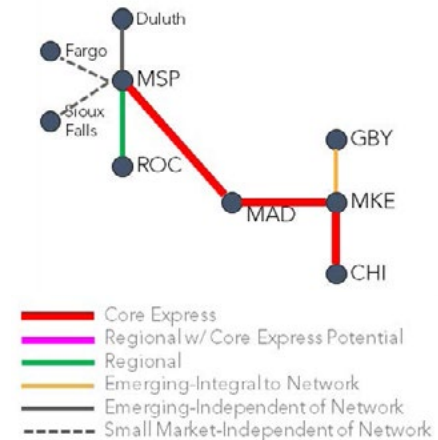


Figure 3-m MWRRP Recommended Routing

information, ticket sales, and other amenities in a location with convenient pedestrian access to the UW, Capitol Square, and Metro Transit bus service.

AIRPORT ACCESS

Metro Transit provides public transit service to the Dane County Regional Airport with Route 20, operating every 30 minutes between the North Transfer Point and East Towne Mall. Transfers at either terminal allow passengers to travel to central Madison, the UW, and other destinations in the Metro Transit service area. A trip between the Capitol Square and the airport, a five-mile trip, is currently scheduled to take 35-47 minutes, including a nine- to twelve-minute wait at the North Transfer Point.

Direct limited-stop service between central Madison and the Dane County Airport has been investigated intermittently. The region's

Lake Street Ramp Location



Figure 3-n Lake Street Ramp Location

ability to introduce the service is limited by several factors. First, transit ridership from the airport is approximately 15 passengers per day (2019). Although it is unclear what the demand potential would be with faster, simpler service, it is unlikely that an express fixed-route service designed specifically around service to the airport could be operated with sufficient frequency to draw enough ridership and be a cost-effective use of funds. Second, the service would be duplicative of parallel service in the corridor, such as existing routes 20, 2, and 4, and the planned North/South BRT service.

The planned Bus Rapid Transit system includes service on Packers without direct service to the airport. Although BRT service to the airport would provide a fast, high quality trip between the airport and central Madison

without a transfer, the current ridership at the airport does not justify the provision of premium transit service to this destination. Furthermore, providing BRT service to the airport would necessitate eliminating or reducing BRT service to identified Environmental Justice areas and other residential areas along Northport Drive; to date in the process, Network Redesign team members, the public, and the City of Madison Transportation Planning & Policy Board (TPPB) have preferred providing this service to the Northport Drive area over to the airport. The draft Metro Transit Network Redesign Plan does call for 30-minute direct bus service to the airport using Sherman Avenue.

Although bike lanes and off-street routes provide numerous approach routes to the airport, bicycle access to and from the Dane County Regional Airport is discouraged by several gaps in the off-street network and a lack of wayfinding signage indicating where bicyclists should go at key decision points. The road accessing the airport, International Lane, is rated as Level of Traffic Stress (LTS) 3, as is the road approaching from the east, Anderson Street. Accessing the airport from any other direction requires crossing, if not traveling on, Packers Avenue (LTS 4). Closing these gaps in the low-stress network would vastly improve bicycle access to and from the airport, facilitating the use

DCRA Bike Plan Detail

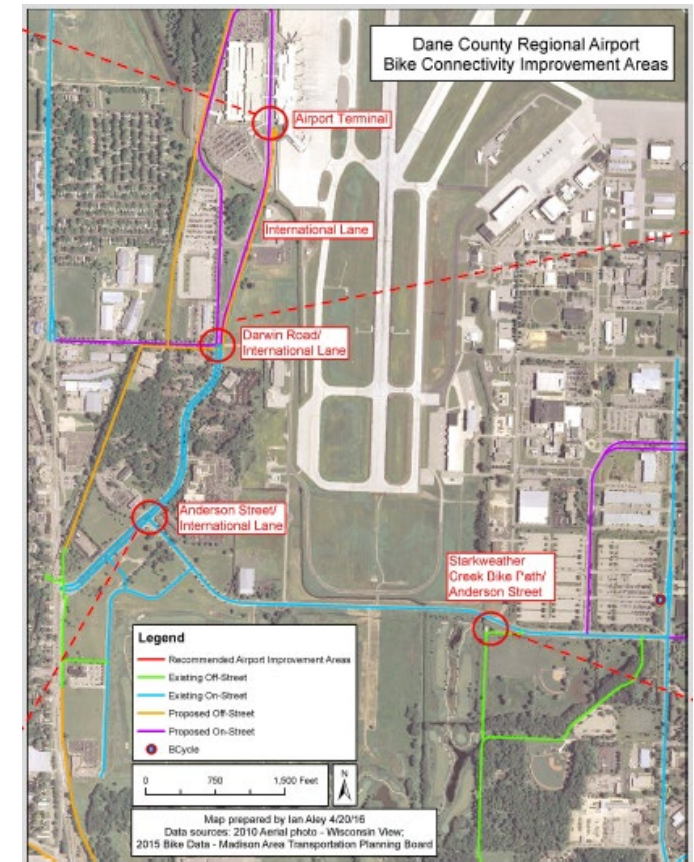


Figure 3-o DCRA Bike Plan Detail

of non-motorized transportation modes for travelers and employees. Bicycle connections to the airport and related improvements are the subject of the Dane County Regional Airport Bike Plan, a detail of which is shown in Figure 3-o.²⁵

²⁵ Dane County Regional Airport Bike Plan (Jollay, Cotter, and Ale), 2016; see also <https://youtu.be/-LoNzvrEtxA?t=323>



Freight Transportation

FREIGHT MOVEMENT

The region's economic prosperity depends on the efficient movement of freight. Freight transportation is a key factor in the efficiency, productivity, and profitability of most businesses, and is critical to economic growth.

In recent years, a shift towards online shopping from traditional brick-and-mortar stores has had a major impact on the way freight moves in the community. It has fundamentally changed the last stage of freight movement, aka the "last mile," for consumer goods. In the past, the last mile would be a delivery to a retail store. Today, many of these shipments terminate at private residences. While this has led to more delivery truck traffic in residential neighborhoods, the full impact of online shopping on traffic congestion and emissions is unclear—depending on the efficiency of truck deliveries, whether deliveries replace personal vehicle trips, and other factors.

Between 2014 and 2019, the total tonnage of freight shipments in Dane County increased by about 8.5%.²⁶ In 2014, a total of 23.7 million tons of freight were moved in Dane County, 98% of which was carried by truck. In 2019, 25.6 million tons of freight were moved in the county, 95% of which was carried by truck. The slight decline in the share of freight carried by truck, is a result of a dramatic uptick in the

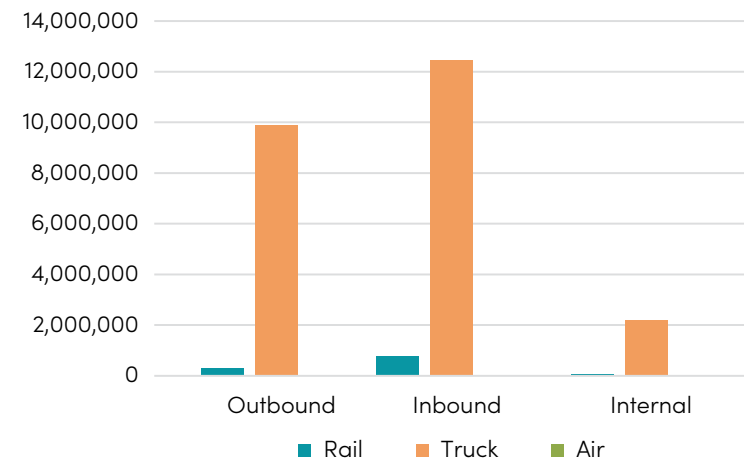
²⁶ Excludes through traffic.

quantity of rail freight, which more than doubled over the five-year period to 1.1 million tons in 2019. In terms of weight, the quantity of freight moved by air and other modes (pipelines) accounted for roughly 0.1% of all freight moved in 2014 and 2019.

The value of freight shipments in the county increased by 4% during this period, from \$24.1 to \$25.1 billion. Trucks are the dominant mode by value, carrying 90% of the county's total freight value in 2019, while air cargo accounted for 8.5%, and rail carried less than 2%. The value of air freight increased by 28% between 2014 and 2019, from \$1.6 to \$2.1 billion. The value of rail freight also grew during this period, increasing by nearly 48%, but its total value remains below \$450 million. The high value and low weight of air shipments is due to air cargo being largely restricted to the most high-value time-sensitive goods. Rail tends to carry the lowest value, least time-sensitive shipments.

Outbound shipments account for just under 40% of the total, in terms of both weight and value, with inbound shipments accounting for slightly more than 50%, see Figures 3-p and 3-q. The imbalance between outbound and inbound

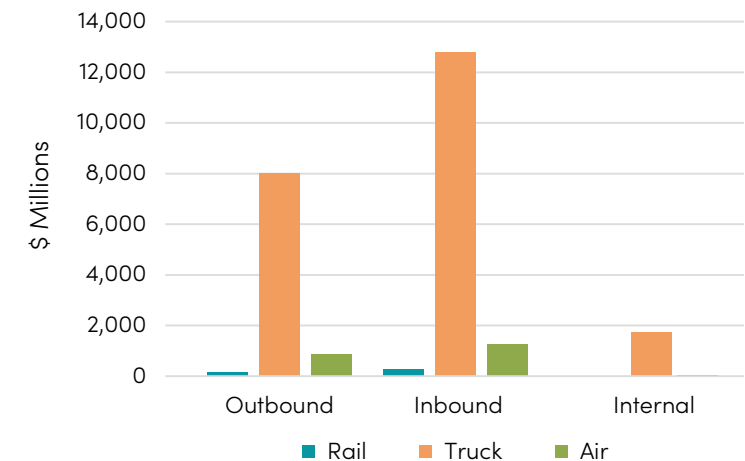
Dane County Freight Tonnage 2019



*Other modes, which account for less than 0.1% of total tonnage, are excluded.

Figure 3-p Dane County Freight Tonnage 2019

Dane County Freight Value 2019



*Other modes, which account for less than 0.1% of total value, are excluded.

Figure 3-q Dane County Freight Value 2019

Top Out-of-State Origins for Dane County Freight by Weight 2019

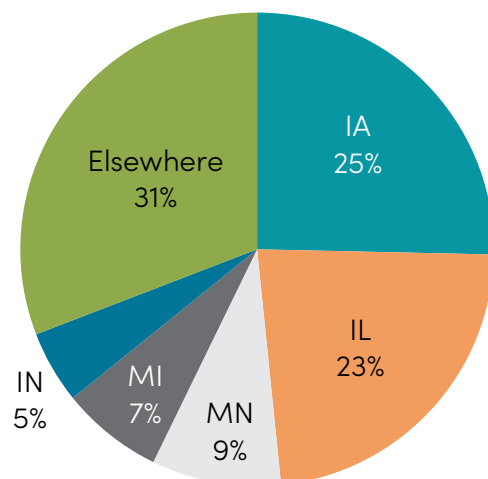


Figure 3-r Top Out-of-State Origins for Dane County Freight by Weight 2019

Top Out-of-State Destinations for Dane County Freight by Weight 2019

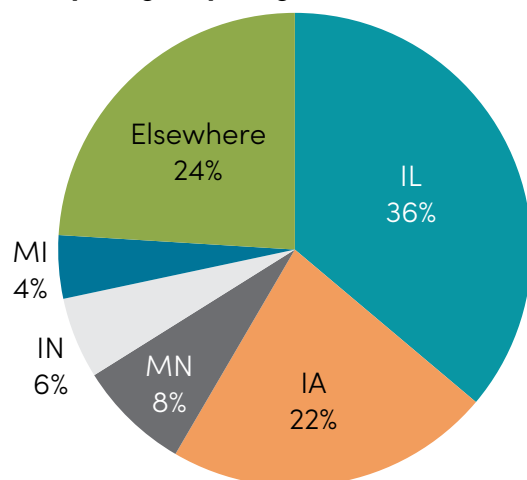


Figure 3-s Top Out-of-State Destinations for Dane County Freight by Weight 2019

Top Outbound Commodities 2019

Commodity	Tons	Commodity	Value
Grain	1,570,977	Drugs	\$887,970,068
Petroleum Refining Products	1,172,291	Petroleum Refining Products	\$778,870,068
Broken Stone or Riprap	984,502	Truck Trailers	\$743,974,633
Misc Waste or Scrap	901,171	Warehouse & Distribution Center	\$675,849,556
Gravel or Sand	893,498	Misc Plastic Products	\$403,255,734
Dairy Farm Products	688,848	Meat Products	\$264,185,598
Warehouse & Distribution Center	548,205	Dairy Farm Products	\$256,251,418
Prepared or Canned Feed	408,141	Bread or Other Bakery Products	\$232,072,452
Ready-mix Concrete, Wet	371,150	Misc Waste or Scrap	\$226,605,827
Cut Stone or Stone Products	257,099	Misc Agricultural Chemicals	\$193,669,535
Other Commodities	2,397,212	Other Commodities	\$4,379,022,789

Figure 3-t Top Outbound Commodities 2019

freight volumes is likely due to the Madison area's economic base, which is tilted towards healthcare, education, government, and technology, industries that employ many consumers but that are not reliant on the export of goods from the area.

By tonnage, Dane County's trade is almost evenly split between locations inside and outside the State of Wisconsin. 46% of Dane County's inbound freight comes from out of state, with 54% coming from in-state locations. 52% of Dane County's outbound freight is bound for out-of-state destinations, while 48% goes to other counties in Wisconsin. The top out-of-state origins and destinations of Dane County freight shipments, by weight, are detailed in Figures 3-r and 3-s.

TOP COMMODITIES

Dane County's top outbound commodities in 2019, as determined by weight and value, are shown in Figure 3-t. Four of the top ten commodities by weight are also among the top ten commodities by value. Many of the other commodities in the list, however, represent commodities that are extremely high or low values by weight. For example, the total weight of drugs, which represented nearly 10% of total outbound commodity value in 2019, was just 26,070 tons—just 0.3% of total outbound tonnage. Similarly, broken stone or rip rap, which accounts for 12% of outbound tonnage, represents just 0.1% of total outbound value.

Some of the top outbound commodities by weight and value are also among the top ten inbound commodities, as shown in Figure

Top Inbound Commodities 2019

Commodity	Tons	Commodity	Value
Broken Stone or Riprap	2,539,449	Warehouse & Distribution Center	\$1,366,172,762
Gravel or Sand	2,143,039	Motor Vehicles	\$839,495,531
Warehouse & Distribution Center	1,108,150	Drugs	\$611,652,313
Grain	571,499	Motor Vehicle Parts or Accessories	\$479,566,932
Ready-mix Concrete, Wet	540,013	Misc Plastic Products	\$381,645,185
Petroleum Refining Products	507,625	Petroleum Refining Products	\$341,862,708
Concrete Products	382,365	Instruments, Photo Equipment, Optical Eq.	\$334,050,127
Distilled or Blended Liquors	283,219	Electrical Equipment	\$259,841,709
Misc Field Crops	274,320	Livestock	\$246,394,029
Asphalt Paving Blocks or Mix	237,936	Misc Manufacturing Products	\$242,000,078
Other Commodities	4,645,125	Other Commodities	\$9,180,037,390

Figure 3-u Top Inbound Commodities 2019

Top Internal Commodities 2019

Commodity	Tons	Commodity	Value
Petroleum Refining Products	663,630	Petroleum Refining Products	\$445,083,568
Ready-mix Concrete, Wet	360,375	Drugs	\$236,682,248
Broken Stone or Riprap	325,164	Truck Trailers	\$87,300,798
Gravel or Sand	291,320	Warehouse & Distribution Center	\$69,706,367
Cut Stone or Stone Products	90,709	Bread or Other Bakery Prod	\$46,780,167
Warehouse & Distribution Center	56,541	Misc Plastic Products	\$42,366,652
Liquefied Gases, Coal or Petroleum	38,749	Household Cooking Equipment	\$38,638,339
Concrete Products	33,895	Engrg, Lab or Scientific Equipment	\$38,509,396
Potassium or Sodium Compound	31,500	Misc Electrical Industrial Equipment	\$37,094,419
Fertilizers	31,088	Lighting Fixtures	\$34,140,357
Other Commodities	302,552	Other Commodities	\$3,600,534

Figure 3-v Top Internal Commodities 2019

3-u. These include products in the warehouse and distribution center commodity group (consumer goods) and those in the petroleum refining products group (gasoline, etc.).

As shown in Figure 3-v, freight shipments beginning and ending entirely within Dane County are dominated by petroleum refining products, the top commodity by both weight and value.

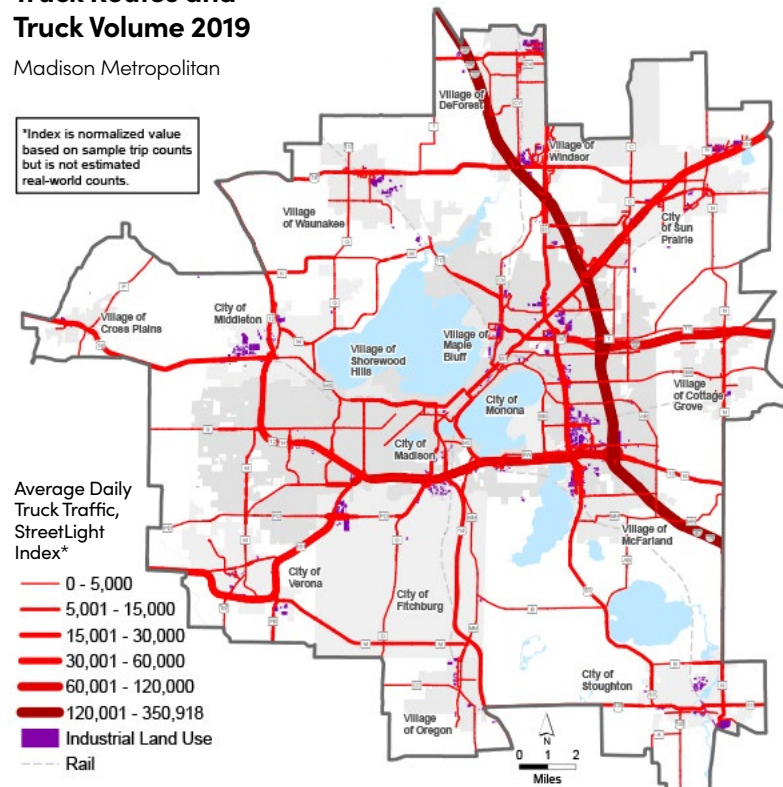
FREIGHT FACILITIES**Trucking**

The vast majority of Dane County's freight is carried by trucks traveling on designated truck routes. Official designation as a truck route is important because trucks must normally use the shortest path between designated truck routes and their destinations. Dane County's primary long distance truck routes include the Interstate and US highways that pass through the county, including I-39/90/94, the Beltline, and US Highways 51 and 151. These routes connect the metropolitan area to surrounding cities such as La Crosse, Eau Claire, Wausau, the Twin Cities, the Fox Valley Cities, Janesville, Dubuque, Rockford, Milwaukee, and Chicago.

Local truck routes range from major local arterials, such as University Avenue, to segments of local streets serving small clusters of businesses. These routes are integral for moving freight around the region as well as to and from their local destinations. Local routes are defined by Dane County and local municipalities.

Truck Routes and Truck Volume 2019

Madison Metropolitan



Map 3-aa Truck Routes and Truck Volume 2019

The metropolitan area is home to numerous trucking companies, most of which cluster near industrial areas and truck routes. Many truck companies are located along the US Highway 51 corridor due to the corridor's relatively easy access to the interstate system.

Dane County's industrial areas and truck routes, including the relative share of truck traffic on each, is detailed in Map 3-aa. Truck traffic volume is shown as StreetLight Index. StreetLight Index volume estimates are

not estimates of actual daily truck traffic; they describe the relative levels of truck traffic only. So, for example a road with an index value of 10,000 is estimated to carry twice as many trucks each day, on average, as a road with an index value of 5,000.

While congestion in the Madison area is modest compared to many other large urban areas, it does impact some key freight routes. Travel time reliability is a particular challenge on the Beltline, between USH 51 and Verona Rd (USH 18/151), and USH 51, between East Washington Avenue and the Beltline, during morning and afternoon peak periods. See the Roadways section for more information on congestion and travel time reliability.

Air

The Dane County Regional Airport (MSN) on the north side of Madison provides air cargo service to the region. Four dedicated cargo airlines currently serve the airport. Passenger airlines also regularly carry freight in addition to passengers and their luggage.

Rail

The Wisconsin and Southern Railroad (WSOR), a regional railroad, is the principal operator on all of the rail lines in the area except for a portion of rail line that runs from Madison north to DeForest that is owned by Canadian Pacific. WSOR connects Dane County with locations throughout southern Wisconsin and into northeastern Illinois, operating on over 750 miles of track.



Chapter 4: Our System Tomorrow: 2050



Our System Tomorrow: 2050

What will our transportation system look like in 2050? What critical issues and drivers of change will shape how our transportation system grows and evolves? How do we leverage transportation to achieve our long-term vision for the region? This chapter explores these issues, identifies the future needs of our transportation system, and provides recommendations and supporting actions to make the vision a reality.

Critical Issues

As the greater Madison region's transportation system evolves, three critical issues that should play an important role in planning and decision-making are equity, climate change, and health. Each is directly affected by the benefits and burdens of the transportation system, and each deeply affects quality of life.

Central to local and regional agencies' ability to act on equity, climate change, and health is the effective coordination of transportation and land use strategies that naturally support these goals. The foundation for this is community design that provides access for all to transportation options, affordable housing, and other basic needs, thereby fostering equitable access to opportunity, wise use of natural resources, and the ability of individuals to live healthy, sustainable lives.

To provide a framework for this coordination, the Greater Madison MPO works closely with the Capital Area Regional Planning Commission (CARPC) to align the agencies' regional plans and implementation strategies that guide communities. The goals, recommendations, and performance measures in the *Connect Greater Madison Regional Transportation Plan (RTP) for 2050* reinforce the goals and objectives of CARPC's *Regional Development Framework (RDF)*, together promoting positive outcomes for equity, climate action, and health.

The following sections summarize the significance of these three critical issues; their

relationship to our transportation system; and how the RTP advances each.

EQUITY

Existing definitions of "transportation equity" include common themes, but vary based on the areas to which they are applied and the perspectives of those involved in the development process. A typical definition is something like:

Transportation equity means that transportation decisions are made with deep and meaningful community input that leads to transportation networks and land use structures that support health and well-being, environmental sustainability, and equitable access to resources and opportunities. – Urban Institute¹

The critical connections between equity, land use, and transportation are clear in the long history of racial and economic segregation in the U.S., perpetuated through policies, programs, and projects such as urban renewal, urban freeways, exclusionary zoning, and more. The 2020 Black Lives Matter movement and nationwide reckoning with systemic and institutional racism – sparked in part by the killing of George Floyd in a Minneapolis bicycle lane by a uniformed police officer – prompted

¹ Urban Institute (2020). *Access to Opportunity through Equitable Transportation*, https://www.urban.org/research/publication/access-opportunity-through-equitable-transportation/view/full_report (p. 3).

a necessary re-focusing in the planning profession on undoing the harms caused over the last century. Although the scale and pervasiveness of institutional racism has only recently become apparent to many planners, the American Planning Association's Code of Ethics² is explicit that planners must work to achieve economic, social and racial equity, and center the voices and needs of minority communities.

The disparate impacts of the COVID-19 pandemic on various demographic groups further highlighted inequities at many levels of society nationwide, including in transportation access and transit dependence. When safer-at-home orders were issued in March 2020, many "choice" transit riders who were either able to telework or switch to a personal vehicle, stopped riding. Many essential workers, however, including grocery and healthcare staff, continued to rely on transit to access their jobs. This pattern was clear in the Madison area, where overall Metro Transit ridership declined markedly with safer-at-home orders, yet decreased the least in areas with the largest populations of transit-dependent riders – primarily people of color and those with low incomes.³

For residents of these areas, the combined impacts of spatially segregated land use policies; transit service optimized for white-

collar commuters; poor sidewalk and bicycle network connectivity⁴; and the high cost of owning and operating a private vehicle; pose significant barriers to economic mobility and access to basic needs. Exacerbating this situation, undocumented immigrants in Wisconsin are not able to obtain a driver's license, restricting their legal transportation options even if they are financially capable of owning a private motor vehicle.⁵

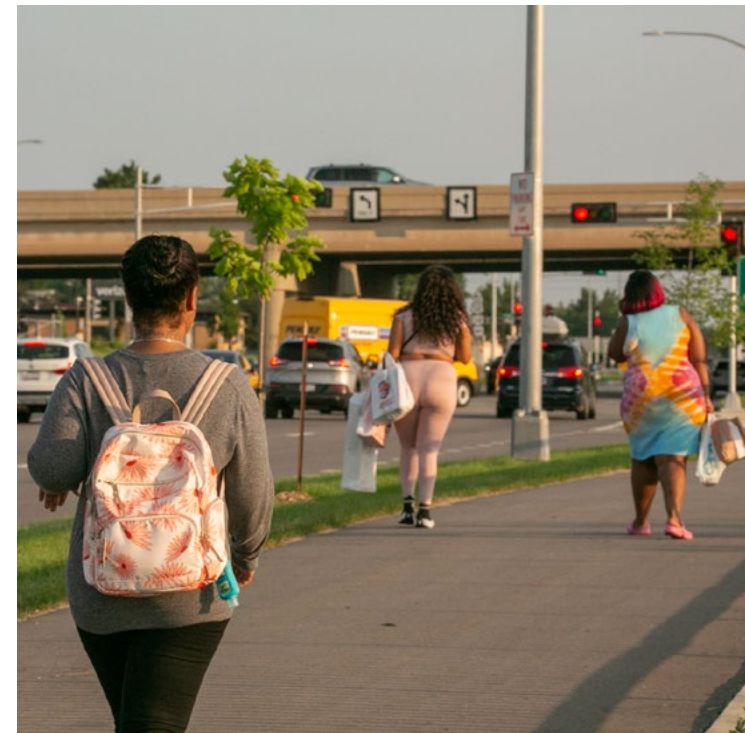
In light of these extreme challenges, it is imperative that planners and policymakers apply an equity lens throughout transportation and land use decision-making processes – from implementing public engagement efforts, to creating plans and finalizing designs in consultation with those who will be most impacted. To this end, the RTP and RDF use the same socioeconomic forecasts and same forecast growth scenario, and apply consistent goals and strategies aimed at advancing equity and reducing racial disparities. A critical shared focus is prioritizing land use and transportation decisions that improve access to affordable housing, transportation options, jobs, and services for all. As part of the planning

⁴ See the MPO's *Pedestrian and Bicycle Facility Requirements, Policies, and Street Standards* report at https://www.greatermadisonmpo.org/planning/documents/PedestrianFacilityRequirementsandPoliciesandStreetStandards_FINAL_5_25_21.pdf (beginning on page 56)

⁵ Sixteen states and the District of Columbia have enacted laws enabling undocumented immigrants to obtain driver's licenses <https://www.ncsl.org/research/immigration/states-offering-driver-s-licenses-to-immigrants.aspx>

² <https://www.planning.org/ethics/ethicscode/>

³ Metro Transit Network Redesign Choices Report, <https://www.cityofmadison.com/metro/documents/network-redesign/ExistingConditionsChoicesReport-20210311.pdf> (pages 11-12)



process, the MPO and CARPC analyzed assumptions and plans relative to the potential impacts on Environmental Justice (EJ) Priority Areas, and coordinated engagement with minority and low-income populations to gather input; this engagement will continue to be a priority in future planning efforts.

To further advance equity in its policies and processes, the MPO recently revised local scoring criteria for the two federal funding programs for which it selects projects (Surface Transportation Block Grant-Urban and Transportation Alternatives), increasing the proportion of points earned by projects that improve transportation access to and from

MPO-identified EJ areas.⁶ The MPO has also begun to collect data for a number of new equity-based performance measures and metrics that will help monitor equity-related progress and setbacks in a transparent and accountable way, and support efforts to improve transportation equity with relevant data. Finally, the MPO conducts an environmental justice review of all projects in the Transportation Improvement Program (TIP) on an annual basis.⁷

An assessment of local conditions related to transportation equity and environmental justice, and an EJ analysis of projects in the RTP, can be found in Appendix C.

CLIMATE CHANGE

Climate change is a defining critical issue of our time that is causing unprecedented global effects on our natural systems and built environments. Each year brings new record-breaking weather extremes and more frequent severe weather events including floods, droughts, and heatwaves. Changes in temperature and precipitation are intensifying storm damage and accelerating infrastructure deterioration. Without action to reduce the causes of climate change, adapting to future impacts will become more difficult and costly. Drastic reductions

⁶ STBG-U criteria amended 2021, STBG-TA criteria amended 2019 and 2021

⁷ See <https://www.greatermadisonmpo.org/planning/improvementprogram.cfm> for current TIP and project EJ analysis



2018 Flooding At Old Sauk & N. High Point Rd.

in greenhouse gas (GHG) emissions from all sectors of the economy are necessary in the coming decades to mitigate possible catastrophic outcomes.

Transportation systems both contribute to and suffer from the impacts of climate change. As of 2019, transportation accounts for the largest share (29%) of all U.S. GHG emissions, of which 58% come from light-duty vehicles.⁸ Transportation infrastructure is increasingly

⁸ U.S. EPA, "Fast Facts on Transportation Greenhouse Gas Emissions," <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>. Accessed on 2/28/2022.

vulnerable to extreme weather events that degrade system integrity and performance, resulting in more frequent maintenance needs, increased repair costs, and other economic costs. These climate change-induced extremes pose serious threats by making it more difficult to provide crucial transportation services relied upon by individuals and communities. Under these circumstances, ensuring that transportation systems are resilient, or able to withstand and recover rapidly from adverse conditions and events, while also reducing the GHG emissions of the transportation sector, is a vitally important challenge.

To mitigate the harmful effects of climate change, transportation providers and decision makers must prioritize strategies that reduce the number and length of trips that are made in personal vehicles.

Well-planned public transportation is a particularly effective tool, as a typical trip on public transit emits 55% fewer GHG emissions than driving or ride hailing alone; and if the fleet is electrified, an electric bus emits 62% fewer emissions than an average diesel bus.⁹ Designing communities to make it easier to take more daily trips by walking and bicycling is also essential, while broader adoption of telework presents an additional opportunity to reduce driving.

⁹ Transportation Research Board. 2018. TCRP Research Report 226: An Update on Public Transportation's Impacts on Greenhouse Gas Emissions. Retrieved from: <https://www.trb.org/Main/Blurbs/181941.aspx>.

To support this work, the MPO collaborates with CARPC to prioritize regional planning strategies that build climate change resiliency and reduce GHG emissions from the built environment. A critical shared goal is to promote compact, mixed-use development that supports walking, bicycling, and public transit. Other climate-related goals in CARPC's RDF that involve increasing tree canopy, increasing water infiltration, and decreasing the urban heat island effect are further supported by RTP 2050 goals for environmental sustainability and system performance, which speak to mitigating the



2018 Flooding Damage

environmental impacts of the transportation system and limiting demand for future roadway expansions.

HEALTH

Transportation plans, policies, and projects directly influence public health by determining the type and quality of transportation options available to help people get where they need to go. As a core element of the built environment, transportation is a critical social determinant of health¹⁰ that often disproportionately burdens low-income and minority communities. In transportation planning, it is vital to consider the health implications of decisions and to involve affected communities in the decision-making process, in order to achieve systems that support health and a high quality of life for all.

Transportation affects public health in four key areas:

- **Physical Activity:** The ability of individuals to easily integrate physical activity into their daily routines through the transportation choices available to them.
- **Natural Environment:** The impact of transportation on air and water quality, and the ability of individuals to take action on climate change through their transportation choices.

¹⁰ "Social Determinants of Health," Centers for Disease Control and Prevention, <https://www.cdc.gov/socialdeterminants/about.html>. Accessed on 2/25/2022.

- **Safety:** The ability of users of all ages and abilities to safely navigate the transportation system.
- **Access:** The ability of individuals to access basic needs including jobs, healthcare, healthy food, schools, social services, community centers, and green space.

Healthy community design¹¹, which makes it easier for people to live healthy lives through the built environment, uses a combination of land use and transportation strategies to promote physical activity, improve air quality, lower safety risks, and strengthen social connections. This approach relies on cross-sector collaboration among urban planners, engineers, public health professionals and others to act on critical issues including obesity, heart disease, asthma, and traffic injuries and deaths. Key strategies include compact, mixed-use development; quality public transit and active transportation infrastructure; affordable housing; and equitable access to resources such as healthcare, healthy food, greenspace, and community centers.

As the framework for transportation planning and investing in the greater Madison region, the *Connect Greater Madison* RTP coordinates closely with CARPC's RDF, incorporating goals, recommendations, and performance measures that support healthy community design in numerous ways. This

¹¹ "Healthy Community Design," American Public Health Association, <https://www.apha.org/topics-and-issues/environmental-health/healthy-community-design>. Accessed on 2/25/2022.

includes through recommendations and supporting actions detailed in this chapter that focus on improving traffic safety; bicycle and pedestrian infrastructure; public transit and specialized transit services; and transportation demand management (TDM).

The MPO, local communities, and partner agencies, including CARPC and Dane County, must continue to work together to support positive public health outcomes through coordinated transportation and land use planning. Resources provided by the MPO, including the recent intersection safety analysis and safety optimization tool; Low-Stress Bicycle Network report; and Pedestrian/Bicycle Facility Requirements, Policies, and Street Standards report, provide important tools to identify gaps and opportunities, while new resources such as Streetlight Data will further help to visualize data, identify patterns, and guide investments.

Drivers of Change

Transportation is currently experiencing a rapid change not seen since the early 20th century. Some of this change is due to paradigm shifts, such as the growth of telework and the increase in freight going directly to homes due to the rise of online shopping, while other changes are due to the advent of emerging technologies, including connected and automated vehicles. While many of these technologies on their own would be transformational, the confluence of a number of them into and affecting the transportation system at once poses more

questions than answers for manufacturers, consumers, and planners. It will be important to determine quantifiable ways that the new technologies will impact planning – be it newfound capacity, cost savings, or a complete reimagining of the transportation system. It will be important, now more than ever, to recalibrate planning efforts based on these and other emerging trends and technologies and to remain flexible, nimble, and adaptable in the coming years.

TELEWORK

According to a recent Gallup¹² poll, 45% of full-time employees in the US were working partly or fully remotely at the end of 2021, a seismic jump from 6% prior to the start of the Covid-19 pandemic. While telework is not an option for many occupations (e.g., manufacturing, education, health care, and the service industry), national and local surveys indicate that telework is likely to be a common part of workplace structures beyond the pandemic, primarily as a hybrid/part-time option. Relative to the long-term impact that telework may have on vehicle miles traveled in the region, responses to a recent MPO survey indicate that telework may have the potential to help employees reduce their overall weekly driving, and in some cases choose alternate commute modes on their in-office days. Greater adoption of flexible workplace

¹² Saad & Wigert. Remote Work Persisting and Trending Permanent. Gallup, 2021. <https://news.gallup.com/poll/355907/remote-work-persisting-trending-permanent.aspx>

models that include both telework and flexible schedules offers greater opportunity to reduce driving and peak period congestion, in turn reducing peak-period roadway demand and expanding opportunities to prioritize investments in other modes of transportation.



E-COMMERCE AND ONLINE SHOPPING

Online shopping is more popular than ever. In fact, in 2019 the total market share of online retail sales exceeded that of bricks-and-mortar retail locations,¹³ with consumers expecting quick turnaround, in many cases same-day delivery. One study found that although e-commerce has generated an increase in parcel delivery trips, the net effect of e-commerce has been a reduction in VMT and fuel consumption.¹⁴ The rise in e-commerce requires large warehouse

¹³ Rooney, Kate. Online shopping overtakes a major art of retail for the first time ever. CNBC, 2019. <https://www.cnbc.com/2019/04/02/online-shopping-officially-overtakes-brick-and-mortar-retail-for-the-first-time-ever.html>

¹⁴ Stinson, Enam, and Moore. Citywide impacts of e-commerce: does parcel delivery travel outweigh household shopping travel reductions? Argonne National Laboratory, 2019.

and distribution centers in urban settings, particularly locations with prime Interstate access. The recently proposed 3.4 million square foot Amazon distribution center in the Village of Cottage Grove just off the Interstate 94 and CTH N interchange is an example of this. Transportation-related implications of e-commerce include more daily truck traffic around warehouse and distribution centers, and the increased need for loading zone management practices.

SHARED MOBILITY

According to FHWA¹⁵, advancement in social networking, location-based services, the Internet, and mobile technologies have contributed to the sharing economy. The sharing economy can improve efficiency, provide cost savings, monetize underused resources, and offer social and environmental benefits. Benefits also include encouraging multimodal travel by making it possible to move away from automobile ownership when combined with other transportation options such as walking, bike sharing, and transit.

One of the most popular shared mobility models is on-demand ride services, sometimes called ridesharing or transportation network companies, which use smart phone applications to connect passengers to drivers. In many ways this is not very different than traditional taxi services; however, the increased price transparency

¹⁵ Shared Mobility Current Practices and Guiding Principles. FHWA, 2016.

and availability of travel information (such as arrival times and GPS locations) have caused these services to increase in popularity. Examples of this type of service include Lyft and Uber. Local taxi services, such as Green Cab, also utilize similar functionality. The transportation and environmental benefits of on-demand ride services depend upon reaching sufficient demand to allow for multi-occupant rides and on the use of electric vehicles for such services.

Carsharing is another shared mobility model, where individuals have temporary access to a vehicle without the cost and responsibilities of ownership. Typically, the carsharing operator provides insurance, gasoline, parking and maintenance, and participants or members pay a fee each time they use a vehicle. Local examples include Zipcar. Bikesharing, such as BCycle in Madison, allows users to access bicycles on an as-needed basis for one-way mobility and/or round trips. Station-based kiosks are unattended, concentrated in urban settings, and allow for a variety of pickup and drop-off locations. Trips are generally less than 30 minutes.

If applied to transit, the technology could help agencies discover new fixed-routes that may not have otherwise been apparent and also address “first mile, last mile” connections to transit. According to the American Public Transportation Association, shared modes complement public transit, enhancing urban mobility; further, the more people use shared modes, the more likely they are to use public transit, own fewer cars, and spend less on

transportation overall. To be a convenient, accessible, low cost option, shared mobility services do require a critical mass of population density to be successful.

VEHICLE ELECTRIFICATION

According to the Dane County Climate Action Plan, electrifying the transportation sector is a key strategy for achieving deep decarbonization. Even though more than half of the electric generation in Wisconsin today is from coal (55%), the average EV purchased in Wisconsin today emits approximately 40% less carbon dioxide emissions than the average gasoline-fueled car. A federal Executive Order set an ambitious target for 50% of all new vehicles sold in 2030 to be zero-emissions vehicles, including battery electric, plug-in hybrid electric, or fuel cell electric vehicles. Since 2010, battery pack costs dropped 85%, paving the way to sticker price parity with gasoline-powered vehicles; average vehicle range has increased dramatically as charging times have shortened; and electric models available to U.S. consumers has expanded to over 40 and growing.¹⁶

¹⁶ Fact Sheet: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks. The White House, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>

CONNECTED AND AUTONOMOUS VEHICLES

Connected and Autonomous vehicles (CV/AVs) are vehicles in which at least some aspect of safety-critical control functions occurs without driver input. Over time, it is anticipated that vehicles will gradually gain more autonomy. Because of this continuum of automation, “levels of vehicle automation” have been developed to determine how driver-reliant a vehicle is. A vehicle with a rating of 0 has no automation, while a rating of 5 is completely automated (Figure 4-a).

Examples of vehicle automation are becoming more mainstream each year. Many higher-end vehicles currently come

with automated features such as parking assist and crash avoidance. Examples of this type of technology include advanced drive assistance systems (ADAD) that alert drivers to objects or people nearby using radar, sonar, or infrared signals; technologies that apply breaks to avoid crashes; and technologies that avoid collisions by cooperative communication between cell-phone signals, vulnerable users, and vehicles to notify both parties of potential issues.

The future impact of Level 5 (completely automated) CV/AVs on the transportation system is still uncertain. It is likely that fleets and freight will be early adopters. The potential benefits and challenges will largely be dependent on which technology and

service models businesses and consumers embrace, and how regulators and policy makers respond. Benefits of this technology are likely to include a dramatic reduction in crashes, reduced travel times, reduced energy consumption, reduced vehicle emissions, improved reliability, increased roadway capacity, and increased



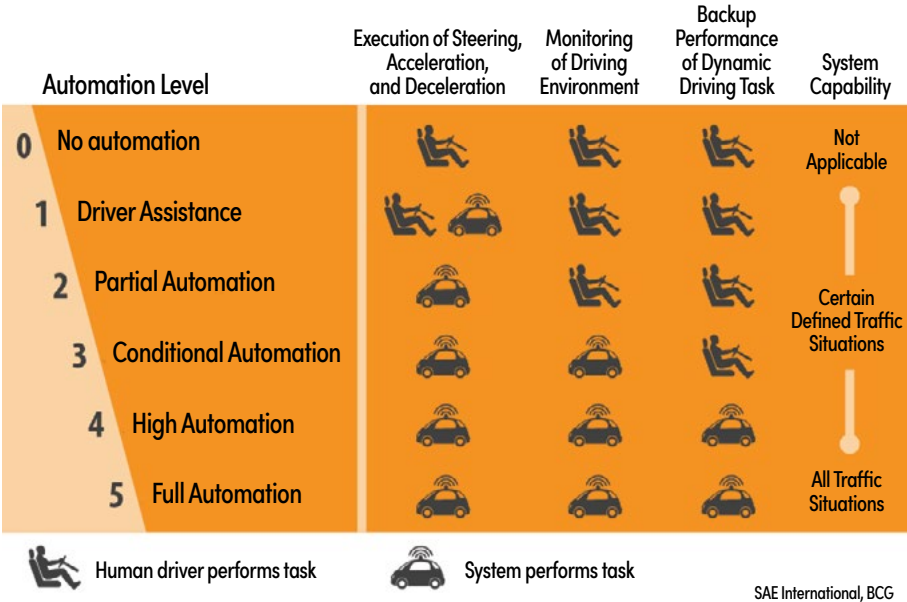
Source: businessinsider.com

transit accessibility. Shared mobility options could become much more attractive since they would be able to provide door-to-door service for all riders. Transit service could be delivered at a reasonable cost in lower-density communities. On the other hand, completely automated vehicles are likely to encourage more driving unless public policies are implemented to make car travel less appealing and to promote shared fleets of such vehicles rather than privately owned ones. For example, if people own their vehicle they can send it on “zero-occupancy” trips or errands. People may also be more inclined to move further from their workplace. Policies to make an automated transportation future more environmentally sustainable will need to be adopted before automated vehicles become widespread.

ITS ADVANCEMENTS

Advanced analytics and machine learning is a technology that provides computers with the ability to learn without explicitly being programmed, particularly when being

Levels of Vehicle Automation



SAE International, BCG

Figure 4-a Levels of Vehicle Automation

inputted with “big data.” Example programs are being created with the capability of using big data to identify patterns that can be used to make well-informed predictions such as traffic models. Some traffic operations centers have automated traffic operations systems that automatically adapt signalization during periods of high traffic or alert operators of potential traffic accidents. An adaptive signal system was installed in the McKee Road and Fish Hatchery Road corridors as part of the Beltline/Verona Road construction project and has recently been installed on the University Avenue and East Washington Avenue corridors. Benefits include increased efficiency of existing roadways through predictive analytics and pre-trip guidance for travelers, and increased safety due to automatic dispatching of 911 services through a mixture of this technology and the “internet of things.”

The MPO plans to test the potential range of impacts on traffic volumes and VMT of some of these drivers of change using its regional travel forecast model to inform current and future planning efforts, including the Beltline and Interstate corridor studies.

Needs and Recommendations

The MPO has synthesized transportation system needs and developed a series of recommendations with supporting actions for each mode of transportation,

as well as transportation demand management (TDM) and transportation system management (TSM). Recommendations are largely focused on optimizing the use and capacity of existing facilities, and improving land use and transportation integration. Recommendations are based on: analysis of the existing transportation network condition and performance; prior and ongoing transportation planning efforts by the MPO and implementing agencies; travel forecasts accounting for future growth; and input received from stakeholders and the public through public engagement activities. Implementing agencies, including WisDOT, Dane County, and local governments, are encouraged to use the following recommendations when undertaking planning efforts and implementing specific transportation projects to ensure regional continuity of the transportation system and support regional transportation plan goals.

The discussion of needs, recommendations, and supporting actions are organized by topic area and mode in the order listed below with the recommendations and supporting actions/strategies highlighted in the tables. Appendix A contains a complete table of the recommendations and supporting actions. Needs and recommendations are organized as follows:



- Land use and Transportation Integration
- Roadways
- Transportation System Management and Operations (TSMO) and Technology
- Public Transit
- Specialized Transit
- Bicycles
- Pedestrians
- Travel Demand Management (TDM)
- Parking
- Inter-Regional Travel
- Freight, Air, and Rail



Land Use and Transportation Integration

Though this is a transportation plan, land use and transportation are intrinsically and inextricably related. The role of transportation is to connect people with opportunities, services, goods, and other resources. In order for transportation policies and investments to be successful in achieving this, they must be coupled with land use plans, policies, and implementing ordinances that support the transportation system goals and plan, and recognize the importance of spatial or geographic proximity, layout, and design of land uses. Dispersed, low-density land use patterns and single use developments increase demand for transportation because of greater travel distances. This increases automobile dependency for accessing economic opportunities and needs, thereby placing other travel modes at a disadvantage. Location-efficient development with a balance of mixed uses and pedestrian oriented design provides easy access to desired destinations and reduces people's transportation costs by making alternative travel modes more convenient and economical.

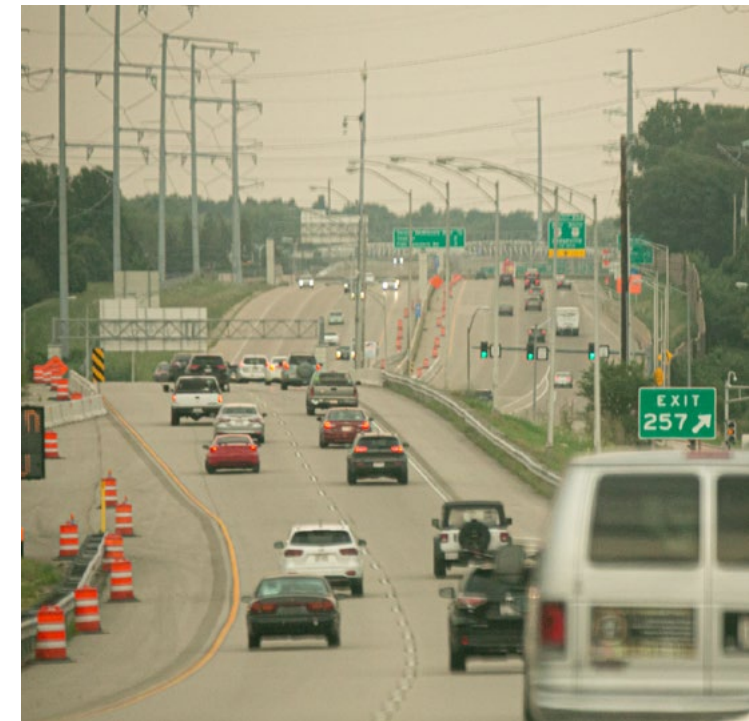
Increasing access to jobs, housing, and services for all people is one of the top priorities of the Capital Area Regional Planning Commission's (CARPC) [2050 Regional Development Framework](#) (RDF)

with supporting objectives of increasing the percent of development that is compact, mixed-use, walkable, and where feasible, transit supportive and supporting job growth in identified areas. Key RDF strategies for achieving this goal are focusing growth in centers and multimodal corridors connected by transit and prioritizing growth in already developed areas. See Figure 4-b for Land Use Recommendations and Supporting Actions.

ADOPT AND IMPLEMENT LOCAL LAND USE PLANS AND POLICIES THAT SUPPORT CARPC'S REGIONAL DEVELOPMENT FRAMEWORK GOALS, OBJECTIVES, AND STRATEGIES

Because of the important relationships between land use and transportation, planning for them must be coordinated. This requires that local communities evaluate how land use decisions will affect the transportation system and travel options for people to access jobs, services, and other destinations. It also requires that transportation agencies and communities consider the effects of transportation investments on land use development demand, travel choices, and regional land use patterns. A first step in this coordination is agreement on a vision for how the region grows that supports regional goals combined with transportation policies and planned investments that support that vision. This Regional Transportation Plan was developed in conjunction with, and is designed to support, CARPC's RDF. Specifically, the RTP

supports the growth scenario that was developed to accommodate projected new population and jobs in a way that helps achieve RDF goals, while also being consistent with local comprehensive plans and recognizing the development market. Local communities are encouraged to use the RDF to serve as a foundation for decisions on where and how to grow, adopting and implementing plans that support the RDF. To a large degree, current local plans do support the RDF. The challenge is in realizing those plans through appropriate development policies and ordinances and supporting public investments.



Land Use and Transportation Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Adopt local land use plans and policies that support RTP goals and policies.		
A	Update land use ordinances and street design and parking standards to remove barriers to mixed use, pedestrian oriented development, where appropriate.	Ongoing	Local governments
B	Prepare detailed neighborhood development plans in areas slated for growth in order to provide for complete neighborhoods with good street connectivity and multi modal access to daily needs.	Ongoing	Local governments
C	Require pedestrian, bicycle, and transit (where appropriate) facilities in (re)developments.	Ongoing	Local governments
D	Plan, zone for, and encourage transit supportive development in planned transit corridors through TOD zoning and other policies.	Ongoing	Local governments
E	Plan for and promote new development in multi-modal mobility corridors to maximize the efficiency of the transportation system and residents' access to jobs and services.	Ongoing	Local governments
F	Collect information on Transportation Insecurity ^[1] at the local level through inclusion of TSI questions in relevant local surveys.	Ongoing	Local governments
2	Provide a mix of housing types with higher densities in areas with multi modal access to jobs and services in order to provide affordable living options in less car dependent neighborhoods.		
A	Plan for and incentivize the location of affordable workforce housing in areas with existing or planned future high quality transit service and in multi modal centers and corridors.	Ongoing	Local governments
B	Prioritize local subsidies for affordable housing projects in areas with frequent transit service.	Ongoing	Local governments
C	Support (re)development in centers and corridors through infrastructure investments and incentives.	Ongoing	Local governments

^[1] See Transportation Security Index and Validation Paper

Figure 4-b Land Use and Transportation Recommendations and Supporting Actions



Roadways

Streets and roadways provide mobility for the vast majority of residents in the region, regardless of whether they drive, take transit, or ride a bicycle. Streets can also be considered the “living rooms” of neighborhoods throughout the community, providing an outdoor space to congregate, recreate, and socialize. It is important to preserve this infrastructure and make targeted enhancements, when appropriate. The following highlights the major needs and recommendations to address them to ensure the efficiency, safety, and cost effectiveness of the roadway network. See Figure 4-c for Roadway Recommendations and Supporting Actions.

PRESERVE EXISTING REGIONAL ROADWAY INFRASTRUCTURE

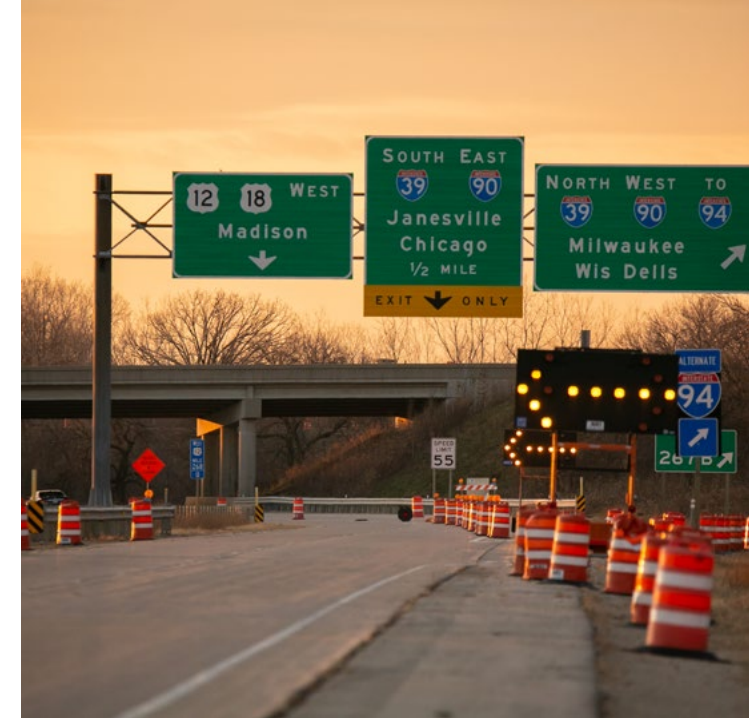
Preserving the condition of the regional roadway system—including pavement, bridges, and other associated infrastructure such as signals, lighting, and storm water facilities—is critical for safe and efficient travel. Well-maintained roads also reduce vehicle operating costs, help retain and attract businesses, and contribute to achieving a high quality of life for the region’s residents.

Roadways and bridges can last a long time before they need to be completely reconstructed or replaced (typically 50+ years for roads and 50–75 years for bridges). However, motor vehicle use and changing weather conditions, especially freeze/thaw

cycle in winters, deteriorate roads over time. Therefore, routine maintenance, periodic rehabilitation, and eventually reconstruction are necessary. The timing and choice of treatment is important for achieving long-term cost savings. Focusing on relatively small-scale maintenance work (e.g., crack sealing, patching and seal coating) prior to structural degradation can avoid the need for costly premature pavement reconstruction.

The state highway system is in better shape than the local roadway system with 100% of the Interstates, 87% of U.S. Highways, and 67% of State Trunk Highways in good condition. The recent five-year trend in state highway condition is mixed with U.S. Highways improving, but State Trunk Highways getting worse. A total of 11% of lane-miles of U.S. Highways and 16% of State Trunk Highways were in poor condition in 2019/’20. The overall condition of county and local arterials has stayed about the same in recent years, but the condition of collectors and local streets has deteriorated. Around 9–16% of these local streets is in poor condition and another 32–38% in fair condition. Additional funding will be needed in the future to maintain the current roadway system, let alone begin to reduce the percentage of the system in poor or fair condition. For more information, see the financial analysis of the plan in Chapter 5.

Figures A-a through A-e in Appendix A lists programmed, planned, and other potential needed high cost, major preservation projects during the plan period. This includes both peripheral area arterial roadways that will



need to be reconstructed to urban standards to accommodate planned development and arterial streets within existing developed areas that will likely require reconstruction due to their age and condition.

CONSTRUCT NEW ROADWAYS TO EFFICIENTLY ACCOMMODATE FUTURE GROWTH

Planning for and building a well-connected roadway network to serve developing areas is crucial for efficiently distributing traffic on the regional system and providing multimodal connections between neighborhoods. As connectivity of the system increases, travel

distances decrease and route options increase, allowing more direct travel between destinations, creating a more accessible and resilient system. Dispersing traffic over more roads is more efficient from a traffic circulation perspective, and also better supports alternative travel modes by providing more route options and by limiting the need for overly-wide arterials and intersections that serve as barriers to bicyclists and pedestrians. Other benefits of a connected network include improved emergency response and increased efficiency and safety of services such as garbage collection, street sweeping, and school bus service.

The traditional roadway functional classification system described in Chapter 3 provides a good starting point for planning and managing a roadway system that provides mobility for moving traffic and goods while at the same balancing that with the other functions streets provide such as property access, parking, and safe, convenient, and comfortable travel by non-motorists. Traffic speeds, access, and level of street connectivity should vary depending on the function of the street. The design of streets and the level of traffic congestion tolerated must also consider the land use context, community development goals, and the needs of all modes of travel. The street typology concept discussed in Chapter 3 addresses these tenets. See the [Pedestrian and Bicycle Facility Requirements, Policies, and Street Standards](#) report for current metro-area community requirements

and standards, as well as national recommendations for these standards.

Map 4-a illustrates the planned future roadway functional classification system, including important planned collector streets to serve (re)development. It also highlights roadways that are likely to move up in classification – existing collectors that will function as minor arterials or minor arterials that will function as principal arterials – due to increased traffic volumes and new development served. Examples include the Egge Rd. corridor (including planned extension to USH 151) in Sun Prairie – forecast as a future minor arterial – and the Grand Ave./Reiner Rd./Sprecher Rd. corridor on the east side – forecast as a future principal arterial.

EXPAND THE REGIONAL ROADWAY SYSTEM STRATEGICALLY TO ADDRESS CRITICAL BOTTLENECKS AND ACCOMMODATE FUTURE GROWTH

Household and employment growth and development and travel trends such as increased suburb-to-suburb travel have led to increasing traffic volumes and congestion levels on some regional roadways. While increased teleworking due to the pandemic has resulted in flatter peaks in traffic and slightly less traffic overall compared to pre-COVID, anticipated growth will continue to worsen congestion in the future, eventually negatively affecting the region's economic competitiveness and quality of life. While transportation demand management (TDM)

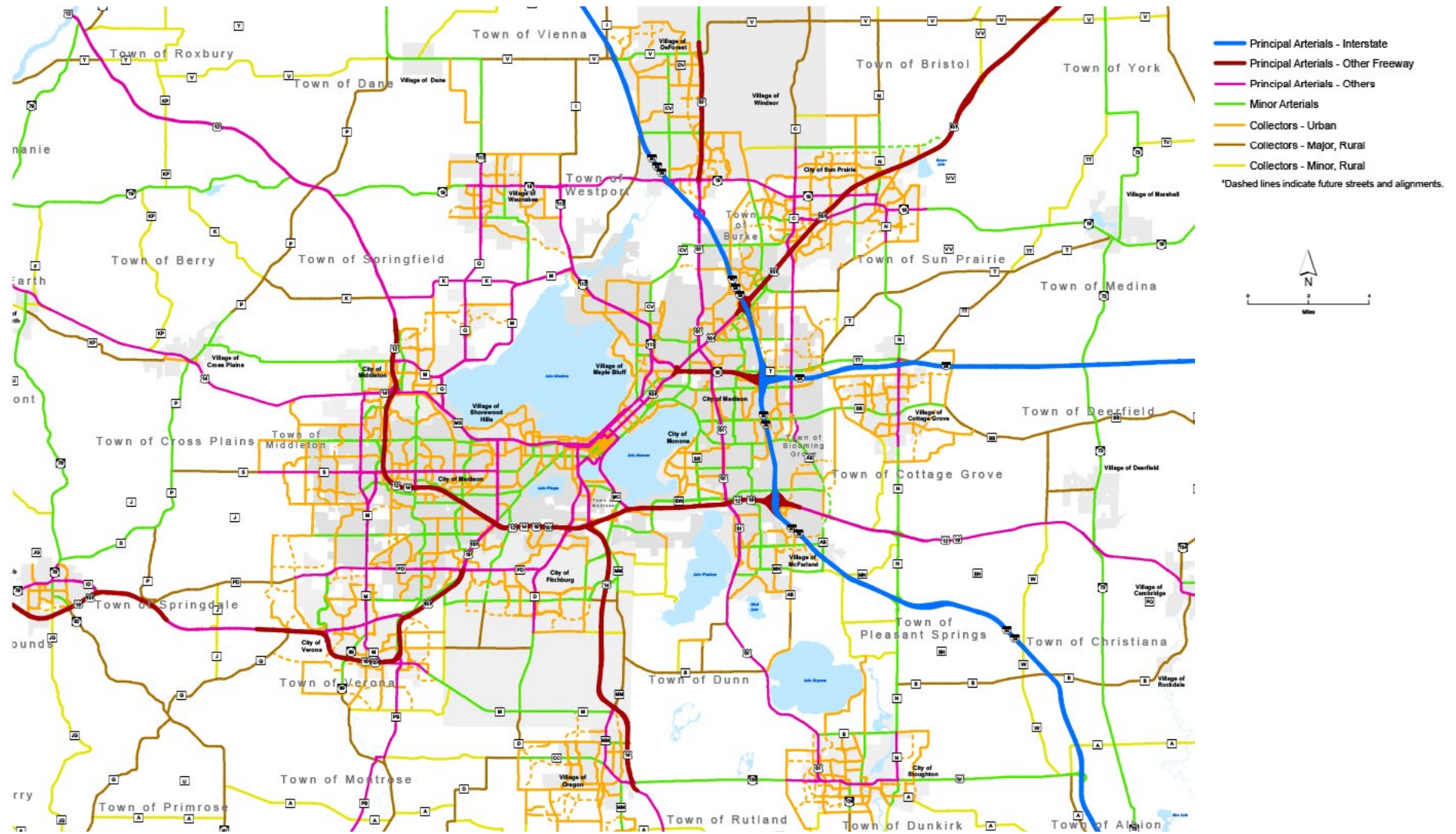
and transportation systems management and operations strategies can mitigate this congestion – and are the only practical and acceptable solutions in central Madison and the downtown business districts of suburban communities – strategic roadway capacity increases will be necessary in the future to address some current bottlenecks and handle projected traffic from planned growth.

In order to evaluate the future performance of the roadway system from a capacity standpoint, the MPO used a regional travel forecast model to project future travel and traffic volumes on the regional roadway system based on forecast household and job



Future Roadway Functional Classification System (2050)

Madison Area, Wisconsin



Map 4-a Future Roadway Functional Classification System (2050)

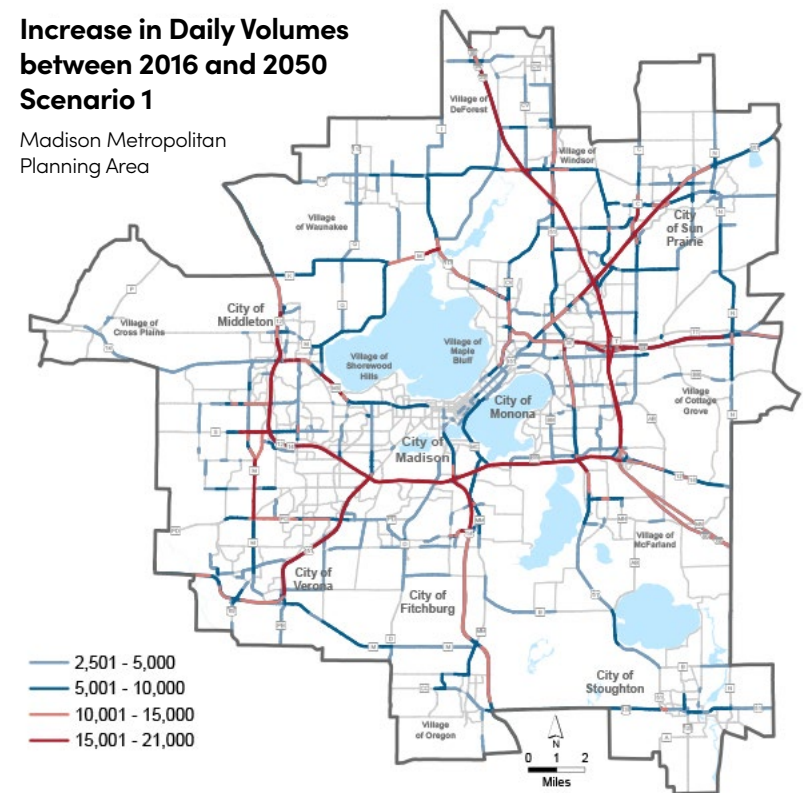
growth and assumed land use development to accommodate that growth. Consistent with the MPO's congestion management policy to utilize transportation demand management (TDM) first in addressing congestion, travel forecasts were based on a land use development scenario that prioritizes growth in infill/redevelopment areas and centers and multimodal corridors and with generally higher densities consistent with CARPC's Regional Development Framework. Also consistent with that policy, the ambitious planned regional transit and bikeway network plans were assumed in the travel model. This includes a full Bus Rapid Transit vision. Finally, consistent with the policy to look next to roadway system management strategies, planned new two-lane collector streets and street extensions to serve developing and redeveloping areas were added to the model. These collector streets help distribute traffic, allowing the regional arterial system to more efficiently handle that traffic. Finally, roadway capacity projects that are programmed for construction in the next five years were added to model. These include the Beltline Flex Lane and County Trunk Highway (CTH) M (North) projects. The travel model was run with these transit, bikeway, and roadway projects to first determine their impacts prior to consideration of recommending any new roadway capacity expansion projects.

Map 4-b shows the projected traffic volume increases on the regional roadway system between 2016 (travel model base year) and 2050 under this scenario (called Scenario 1),

while Map 4-c shows the projected generalized levels of congestion in 2050.

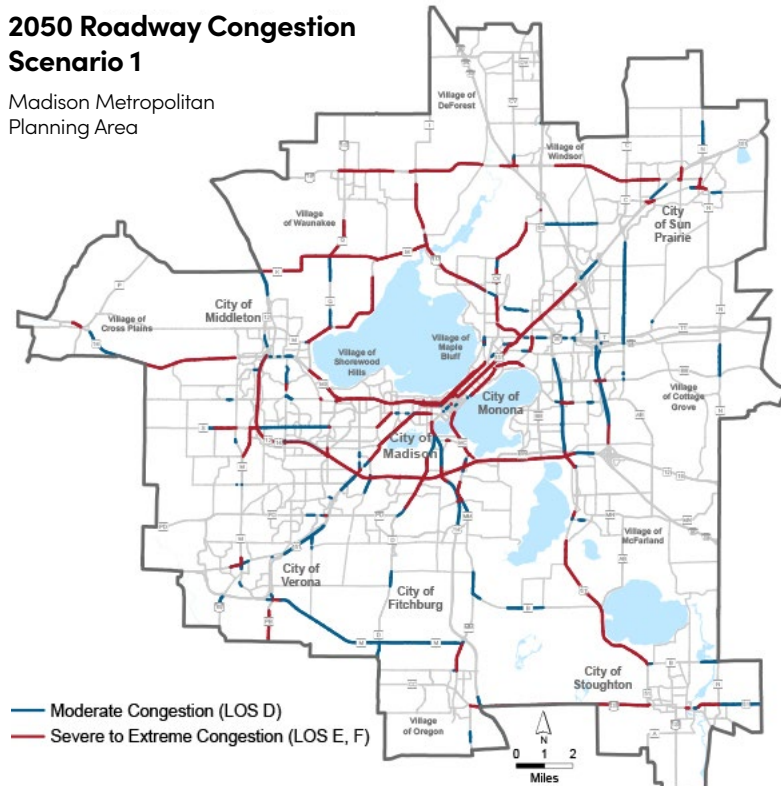
Based on the results of this initial scenario, local roadway capacity project needs were then identified to address corridors projected to be near or over capacity, but only those deemed consistent with plan goals. The two most significant of these are the CTH K (CTH M to US Highway 12) and Reiner/Sprecher Road (O'Keefe to Milwaukee Street and the section on new alignment to CTH AB) corridors. The CTH K corridor is part of the long studied "North Mendota Parkway" concept. The preferred solution to capacity in this corridor would be to build a roadway on new alignment in the corridor to avoid splitting farms and taking homes. If that proves too difficult and costly, the default solution would be to expand CTH K to four lanes. Either way, an interchange is recommended at USH 12, the likely location of which was identified in the USH 12 freeway conversion study. It is recommended that a study of the CTH K corridor be resumed again, a specific route identified, and the corridor officially mapped. This would allow real estate acquisition to begin, a necessary first step for a

construction project. See Map 4-d for all of the planned local arterial capacity expansion projects, also listed in Figure A-b in Appendix A. It is recommended that arterial roadways reconstructed with more than two travel lanes generally include medians, with appropriate openings for turning movements and turn lanes. Access management strategies, such as restricting driveway access, should also be used. These and other design strategies provide for more efficient operations and improve safety.



2050 Roadway Congestion Scenario 1

Madison Metropolitan Planning Area



Map 4-c 2050 Roadway Congestion Scenario 1

Map 4-d also identifies existing and planned new peripheral roadways where a capacity expansion will or may be required at some point in the future to accommodate future development. Based on the planned growth scenario, however, it is not clear that expanded capacity will be needed within the plan timeframe. Timing of reconstruction of these roadways, with or without expanded capacity, is dependent upon future development. In order to keep options open, it is recommended that right-of-way be

reserved, if needed, access managed, and the corridors officially mapped, where appropriate. Many of these are county highways, including CTH Q, CTH CV, CTH T, and CTH AB.

Two state highway capacity expansion projects are currently programmed. The most significant is the Beltline Flex Lane project from Whitney Way to the Interstate, which will be completed in 2022. The other is the section of the larger USH 51 (McFarland to Stoughton) project from Jackson Street to CTH B, scheduled for construction in 2025-'26. Additional major state highway projects potentially involving capacity expansion are expected to come out of the current major corridor studies of the

Beltline (USH 12/14/18/151) (USH 14 to CTH N), Stoughton Road/USH 51 (STH 19 to Beltline), and the Interstate (39/90/94) (Beltline to Portage).

The Flex Lanes on the Beltline are expected to provide the needed capacity for the next fifteen years or so. The current study, which is in its initial phase, is looking at possible long-term solutions to improve traffic operations, including extending the Flex Lanes or adding a general purpose lane

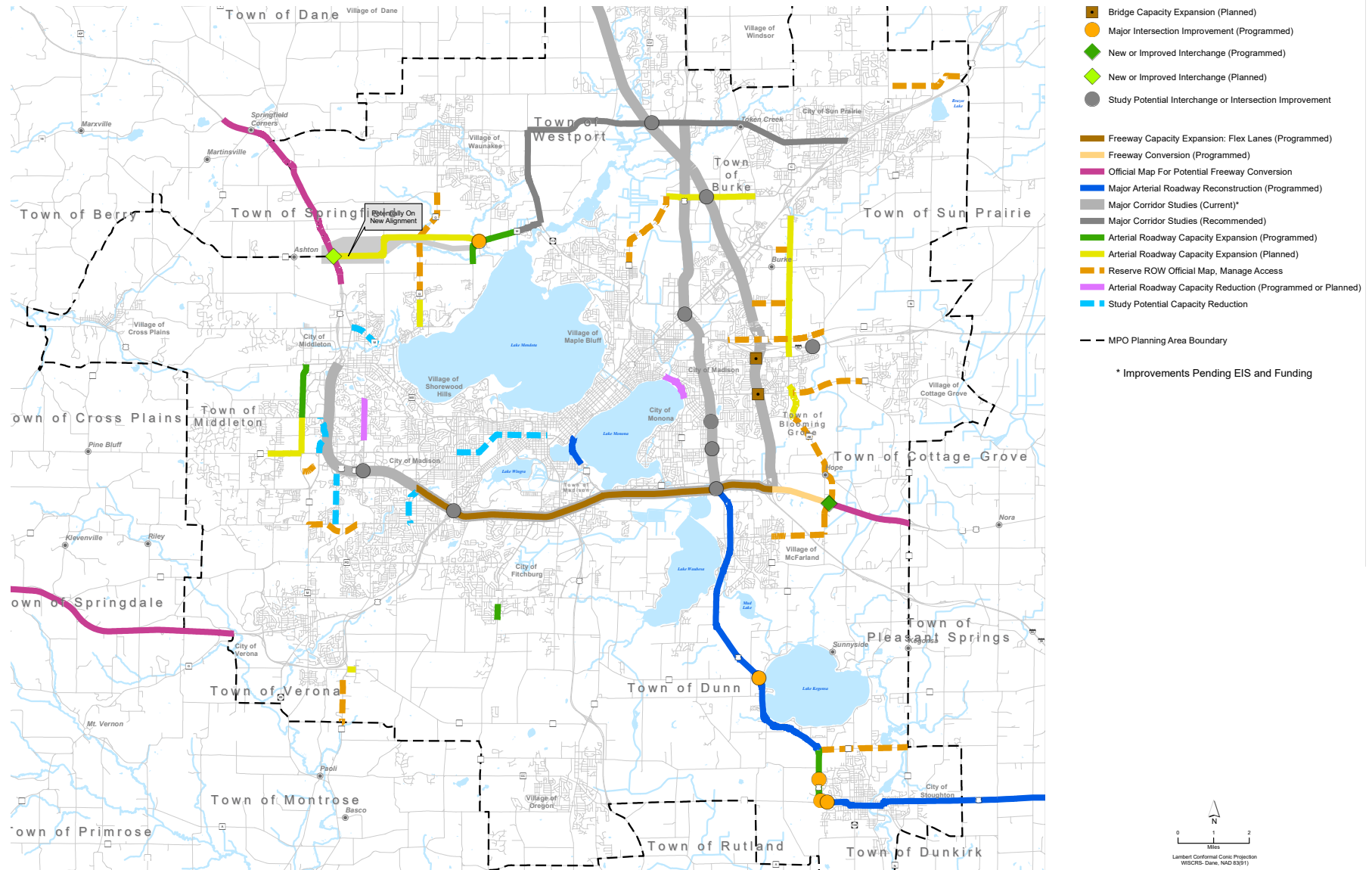
and further interchange improvements. Multimodal improvements in the corridor are also being studied, including street and bike/pedestrian crossings of the Beltline and transit priority through some interchanges. The capacity issues on Stoughton Road are at the remaining at-grade intersections. These intersections are also the worst performing from a safety standpoint. The Stoughton Road study is looking at solutions to these issues along with multimodal improvements; addition of travel lanes is unlikely. The Interstate study is looking at long-term needs in that corridor, which revolve around its heavy freight use and summer tourist traffic peaks. As part of this study, potential new interchanges at Hoepker Road and I-90/94 and Milwaukee Street extension and I-94 will be studied for their impact on operations, including other interchanges. This is being done at the request of the City of Madison.

A future study is recommended for the STH 19/STH 113/CTH M ("North Mendota Parkway") corridor. The timing of this is uncertain, but much of this corridor is anticipated to be nearing or at capacity in the future. Continuation of intersection and other small-scale safety, operations, and multimodal improvements in the corridor are recommended in the interim.

Three state highway corridors have been studied for potential freeway conversions with environmental studies completed and recommended alternatives identified. These are: USH 12/18 (Interstate to CTH N); USH 12 (Parmenter Street to STH 19); and USH

Major Roadway Projects and Studies

Madison Area, Wisconsin



Map 4-d Major Roadway and High Capacity Transit Projects and Studies

18/151 west of Verona. The conversion of the segment of USH 12/18 from I-39/90 to CTH AB with a new CTH AB interchange is scheduled for construction in 2023–2024 to address safety issues in this corridor. For the remainder of that highway and the other two, the next step is to officially map the corridors with potential future freeway conversion dependent on real estate acquisition, funding, and other priorities.

Map 4-d illustrates recommended major capacity expansion and intersection, interchange, and bridge widening projects as well as the aforementioned major state highway corridor studies, also listed in Figure A-a and A-b in Appendix A. Figure A-a lists programmed projects for 2022–2026 and Figure A-b lists additional planned projects grouped into two time periods (2027–2035, 2036–2050). The actual timing of the planned projects will depend on future development and traffic growth, impacts of congestion management strategies, system preservation needs, available funding, and other factors.

Figure A-e in Appendix A includes a short list of “illustrative” major capacity expansion projects that are not part of the fiscally constrained, federally recognized plan at this time. These include projects that will come out of the three ongoing major state highway corridor studies of the Beltline, Stoughton Road, and Interstate 39/90/94. Inclusion of these projects in the federally recognized plan is dependent upon completion of the environmental studies, identification of and regional agreement on the scope and

cost of recommended improvements, and demonstration that funding is likely to be available for them.

INCORPORATE COMPLETE STREETS AND GREEN STREETS CONCEPTS FOR REGIONAL AND LOCAL ROADWAYS

Complete streets are streets that are designed to help people get where they want to go, whatever their mode of choice. Serving the needs of those who have historically been marginalized in the transportation planning process and underserved by the transportation system—low-income people, elderly and disabled people, and racial and ethnic minority groups—is of particular importance. Integrating community context into all planning, construction, and operations activities can help ensure that the goal of providing free-flowing thoroughfares for motor vehicles does not crowd out safety, equity, and other community priorities. While a complete street may or may not be equipped with facilities like sidewalks and bike lanes, the need for facilities to accommodate travelers using alternative modes should be thoroughly considered prior to construction.

Green streets are designed to slow, filter, and cleanse stormwater runoff through the use of permeable pavement, rain gardens, trees, and other features. Using these types of design features can remove up to 90% of roadway pollutants that would otherwise be washed into nearby water bodies. Green streets also help to increase groundwater supplies, improve air quality, and provide

green connections between areas of open space. Some common features of green streets, such as vegetated curb extensions, also serve to calm traffic and improve safety for bicyclists and pedestrians.

MPO policy is to support the adoption of green and complete streets policies by local communities, and to require that streets funded through the STBG-Urban program be designed and constructed as complete streets. The City of Madison is in the process of developing a Complete Green Streets policy to improve livability, and as a way to mitigate and adapt to the effects of climate change.

CONTINUE TO PRIORITIZE SAFETY

The Safe System Approach defines five elements of a safe transportation system—safe road users, safe vehicles, safe speeds, safe roads, and post-crash care—and considers them in an integrated and holistic manner (Figure 4-c). To make meaningful progress, changes are needed in how to think about the traffic safety problem and approaches to solve the problem. Principles of the Safe System Approach include¹⁷:

- **Safe Road Users**—The safety of all road users is equitably addressed, including those who walk, bike, drive, ride transit, or travel by other modes.
- **Safe Vehicles**—Vehicles are designed and regulated to minimize the frequency and

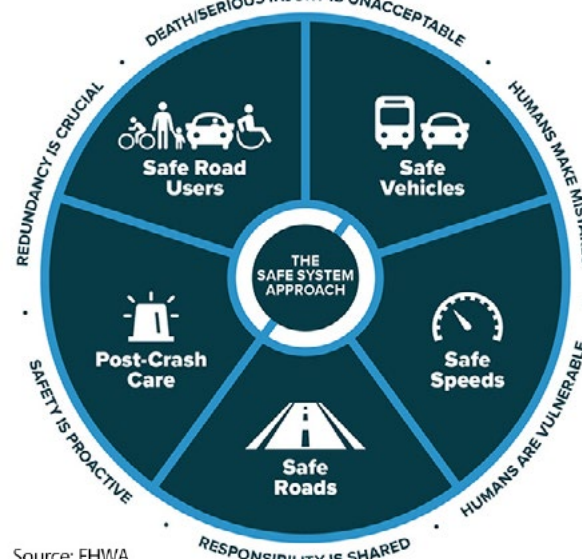
¹⁷ Doctor, M., & Ngo, C. (2022). Making Our Roads Safer Through a Safe System Approach. Public Roads; FHWA-HRT-22-002.

severity of collisions using safety measures that incorporate the latest technology.

- **Safe Speeds**—Humans are less likely to survive high-speed crashes. Reducing speeds can accommodate human-injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility.
- **Safe Roads**—Designing transportation infrastructure to accommodate human mistakes and injury tolerances can greatly reduce the severity of crashes that do occur. Examples include physically separating people traveling at different speeds, providing dedicated times for different users to move through a space, and alerting users to hazards and other road users.
- **Post-Crash Care**—People who are injured in collisions rely on emergency first responders to quickly locate and stabilize their injuries and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

Network screening is a systematic review of roadway crashes to identify problematic locations. In 2021 the University of Wisconsin Traffic Operations and Safety Lab (TOPS Lab) updated the MPO intersection network screening report for 2017-2020 and developed an optimization tool that is recommended to help local agencies identify intersection locations and cost effective safety countermeasure strategies that can

The Safe System Approach



Source: FHWA.

Figure 4-c The Safe System Approach

be used for prioritizing safety projects. The MPO will also be partnering with the TOPS Lab to develop a High Injury Network that can be used to prioritize system-wide safety improvements to help achieve zero deaths and serious injuries on Dane County roadways.

Contributing factors to vehicle crashes may include both roadway design and/or behavioral factors such as speeding, distraction, and impairment. It is critical to continue supporting local efforts to improve roadway safety. Both Madison and Sun Prairie have adopted Vision Zero policies to achieve zero roadway deaths and serious injuries. Strategies include reducing speed

limits, improving bike and pedestrian accommodations, and outreach and education efforts. The Dane County Traffic Safety Commission is a multidisciplinary coalition of public and private organizations, including public health, law enforcement agencies, engineering, judicial, education, and advocacy organizations working together to monitor and improve traffic safety. The Traffic Safety Commission meets quarterly to review serious and fatal crashes, identify possible contributing factors, and make traffic safety recommendations. Current traffic safety emphasis areas that the Commission is working on include: reducing impaired driving; reducing risky driving behaviors; improving pedestrian safety; and centering equity in traffic safety.

ADDRESS SECURITY AND RESILIENCY NEEDS OF THE REGIONAL ROADWAY SYSTEM

The regional roadway system must be able to withstand natural and manmade threats, shocks, and stressors. The region relies on a resilient transportation system that can ensure the movement of people and goods in the face of one or more major obstacles to normal function, such as extreme weather events, major accidents, or other infrastructure failure. As technology plays an increasingly integral role in the transportation system, ensuring the cybersecurity of vital ITS networks will become increasingly important in the future.

Roadway Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Preserve and maintain the region's street and highway system in a manner that minimizes their life cycle cost, maintains safety, and minimizes driver costs while reducing their impact on the environment.		
A	Monitor regional roadway system pavement and bridge condition and continue to coordinate with WisDOT federal performance targets.	Ongoing	MPO, WisDOT
B	Develop and implement asset management plans to assist in making cost-effective decisions concerning the maintenance and rehabilitation of roadways, bridges, and associated infrastructure.	Ongoing	WisDOT, Dane County, local governments
C	Provide for ongoing maintenance activities in major state and local arterial corridors planned for future potential expansion until capacity is needed and major project funding can be secured.	Ongoing	WisDOT, Dane County, local governments
D	Promote the Wisconsin Salt Wise partnership and support additional research and demonstration projects to provide safe roadways in the winter while minimizing chloride and sodium application.	Ongoing	WisDOT, Dane County, local governments
2	Build a well-connected network of regional roadways to accommodate future growth and efficiently distribute traffic to avoid bottlenecks on overburdened routes.		
A	Conduct detailed planning for existing and new streets and utilize official mapping, right-of-way dedications, and other methods to preserve existing and planned regional roadway corridors for potential improvements.	Ongoing	Local governments
B	Utilize travel model to conduct a "build-out" analysis of peripheral area development plans to support planning for future regional roadway system.	Near Term	MPO
3	Incorporate complete streets and green streets concepts for regional and local roadways.		
A	Adopt and implement formal complete streets policy.	Near Term	WisDOT, Dane County, Local governments
B	Adopt and implement green streets policy.	Near Term	Local governments
C	Develop modal priority corridors based on the RTP.	Near-Mid Term	Local governments
4	Expand regional roadway system capacity to address critical bottlenecks and accommodate future planned growth consistent with RTP goals.		
A	Continue or initiate detailed planning, design, and construction of state and local arterial capacity roadway, bridge, and interchange projects shown in Map 4-d and listed in Figures A-a through A-e as needed with consideration given to project phasing where appropriate.	Ongoing	WisDOT, Dane County, Local governments
B	Complete major corridor studies of the Beltline, Stoughton Road/USH 51, and Interstate 39/90/94 . Upon completion of accepted environmental documentation, seek enumeration as Majors projects and advance recommended alternatives. Continue to implement short-term TSM, safety, and multi-modal improvements in the corridors in the interim until Majors program funding is secured.	Near-Mid Term	WisDOT
C	Initiate major study of the STH 19/STH 113/CTH M corridor to identify the long term solution to existing and future congestion and safety issues in the east-west corridor north of Lake Mendota. Continue in the meantime to implement TSM, safety, and multi-modal improvements.	Near-Mid Term	WisDOT, Dane County, MPO

Figure 4-d Roadway Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
5	Adopt a Safe System Approach for addressing safety needs on the regional roadway system through a comprehensive “4-E” approach (Engineering, Education, Enforcement, and Emergency Services).		
A	Implement WisDOT’s Wisconsin Strategic Highway Safety Plan (SHSP).	Ongoing	WisDOT, Dane County, local governments, state agencies, law enforcement agencies, private organizations
B	Develop a high injury network and continue to identify regional high crash severity intersections. Conduct further detailed study of these locations to identify countermeasures and prioritize projects for federal and state safety funding.	Ongoing	MPO, Dane County, local governments
C	Continue to support local safety initiatives such as Vision Zero.	Ongoing	Local governments
D	Continue to support the Dane County Traffic Safety Commission.	Ongoing	WisDOT, local governments, law enforcement agencies, non-profit organizations, MPO
E	Continue to expand state and local safety education efforts, including neighborhood-based initiatives.	Ongoing	WisDOT, local governments, non-profit organizations
F	Support local and county efforts to ensure equitable enforcement of traffic laws.	Ongoing	Local governments
G	Support local efforts to identify corridor level systemic safety improvements, and work with WisDOT to identify changes to safety program criteria to allow funding of such projects.	Ongoing	WisDOT, MPO
6	Address security and resiliency needs related to the regional roadway system.		
A	Update the vulnerability assessment of critical transportation infrastructure in the state as part of development of the State Highway Investment Plan. Monitor identified facilities and make improvements as needed.	Ongoing	WisDOT
B	Update as necessary hazard mitigation and emergency evacuation plans to reduce risk of disruptions to the regional roadway system due to flooding, winter storms and severe weather conditions, terrorism, hazardous material spills, civil disorder, and other events.	Ongoing	Dane County, Local governments
C	Initiate study to identify roadways and other transportation facilities that are susceptible to flooding, identify alternate routes when flooding occurs, and identify improvements to make the facilities more resilient to flooding.	Near Term	MPO, Dane County, Local governments

Figure 4-d Roadway Recommendations and Supporting Actions (Continued from previous page)



Transportation System Management and Operations (TSMO) and Technology

Adding travel lanes to a roadway or other major capacity expansion is often not feasible or desirable because of the cost and many negative impacts to the environment, residents' quality of life, and other roadway users. However, actively managing the transportation system to improve traffic operations can increase the capacity of a roadway without constructing new lanes. Transportation system management and operations (TSMO) includes strategies such as improved traffic signal operations, management of roadway incidents, and traveler information, as well as targeted roadway modifications (often at intersections where most delay occurs) to provide bottleneck relief. Intelligent Transportation Systems (ITS) – technologies or systems (e.g., sensors, computers, communications) that allow multiple agencies to work together – can aid these TSM strategies. Even for roadways that will eventually need to have travel lanes added, TSM can delay the need for the capacity expansion and should be utilized first and in conjunction with the new capacity. In short, TSM, including ITS, is about actively managing the operation of the transportation system using technology and targeted infrastructure investments to improve travel conditions and make the best

use of existing transportation infrastructure. See Figure 4-e for TSMO and Technology Recommendations and Supporting Actions.

IMPLEMENT THE CONGESTION MANAGEMENT PROCESS

To minimize congestion for all transportation modes and reduce unexpected delay, the MPO has adopted a comprehensive congestion management process (CMP) (Appendix F). The CMP prescribes comprehensive transportation system management and operations strategies such as traffic signal coordination, traveler information, and enhanced incident response coupled with physical bottleneck relief through targeted capacity expansion to ensure the most efficient use of resources and minimize the environmental impact of the transportation system. The efficacy of this process is determined in part by an annual performance measurement and monitoring process.

The CMP prioritizes:

1. Strategies that eliminate vehicle trips through land use changes or other actions that reduce peak-period vehicle trips like flexible work hours or telecommuting.
2. Strategies that eliminate peak period vehicle trips by causing a mode change from auto to transit, bicycle, or pedestrian.
3. Strategies that improve the operation of the existing roadway system, making it more efficient for all users.

4. Strategies that add roadway capacity, primarily at bottlenecks or other strategic locations, should only be considered when other strategies prove ineffective and doing so is consistent with other goals and policies.

The development of a regional Transportation Systems Management and Operations (TSMO) plan could help achieve the goals and priorities of the CMP. A TSMO plan is a set of strategies that focus on optimizing operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed. TSMO solutions should be considered at any location that experiences either recurring or non-recurring congestion. TSMO improvements may include traffic signal coordination, integrated corridor management, work zone management, traffic incident management, transit signal priority and more.

IMPROVE THE OPERATION OF THE TRANSPORTATION NETWORK BY MANAGING ROADWAY ACCESS

Access management is the control of the location, spacing, design, and operation of driveways, median opening, interchanges, and street connections to a roadway. Access management is intended to provide vehicular access to land and development in a manner that preserves the safety and efficiency of the transportation system. Access management follows a roadway hierarchy similar to

functional classification. Access management can help increase roadway safety and reduce traffic congestion. Multimodal benefits of access management includes fewer traffic conflict points for motorists, cyclists, and pedestrians, a safer walking environment (e.g., through median refuges for crossing roadways), and reduced delay and travel times for transit riders.

MODERNIZE THE TRANSPORTATION NETWORK THROUGH THE USE OF TECHNOLOGIES THAT IMPROVE THE OPERATIONS OF EXISTING INFRASTRUCTURE

The operation of the transportation system can be impacted not only by roadway design, but also by technologies that modify traffic flow and provide information to influence traveler behavior. In terms of importance, neither method can be understated. To

plan for and coordinate future operational improvements, the MPO adopted the first *Regional Intelligent Transportation Systems Strategic Plan* in early 2016. This plan contains a prioritized list of recommended projects, as well as strategies to guide plan implementation. The plan should be implemented and updated as needed.

PROMOTE THE TRANSITION TOWARDS ELECTRIC VEHICLES BY DEVELOPING CHARGING INFRASTRUCTURE

Transitioning away from traditional fossil fuels toward electric powered vehicles represents one way in which Dane County can decrease emissions, slowing global warming and reducing our reliance on imported fossil fuels. A 2018 study conducted by Frontier Group, Environment America and U.S. PIRG, estimates that Madison would need 202 level 2 chargers in workplaces,

126 level 2 chargers in public places and 14 public DCFCs to accommodate 9,000 electric vehicles within the city limits by 2030.¹⁸ These numbers are based on a conservative city population growth scenario; Madison, and the surrounding communities, may well need more public and workplace chargers than these recommendations. This same study recommends the following to implement clean transportation systems: expanding access to charging infrastructure, increasing familiarity with electric vehicles, and easing range anxiety. Local governments can help speed the growth of charging networks in collaboration with local energy providers by allowing, incentivizing, or even requiring property owners to make those improvements.

¹⁸ Frontier Group, Environment America and U.S. PIRG, <https://frontiergroup.org/sites/default/files/reports/US%20Plugging%20In%20Feb18.pdf>

TSMO and Technology Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Implement the adopted Congestion Management Process.		
A	Continue and improve monitoring of system performance and measurement of the impact of implemented projects utilizing the methodology outlined in the plan.	Ongoing	MPO, WisDOT
2	Develop a Regional Transportation Systems Management and Operations (TSMO) Plan.		
A	Identify, prioritize, and implement corridor and intersection TSM projects to improve traffic and transit operations and safety on the arterial roadway system.	Near Term	MPO, WisDOT, Local Governments

Figure 4-e TSMO and Technology Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Implement access management plans and standards for existing and planned future arterial roadways as development and street (re)construction occur.		
A	Initiate access management plans on congested corridors as development and street reconstruction occur.	Ongoing	WisDOT, Dane County, Local governments
B	Develop a regional access management plan that identifies standards for future arterials roadways, best practices, and safety considerations.	Near Term	MPO
C	Continue efforts to implement short-term safety related and TSM improvement recommendations from preservation/safety studies in state highway corridors, including USH 14 (West), STH 19, and STH 138.	Ongoing	WisDOT
D	Officially map the USH 12 (Parmenter St. to STH 19 West), USH 12/18 (Interstate to CTH N), and USH 18/151 corridors for potential future freeway conversion based on recommended study alternatives. Continue to implement interim access management improvements with future conversion dependent upon ongoing needs assessment and available funding.	Ongoing	WisDOT
4	Modernize the multimodal transportation network using technology.		
A	Include as part of new urban roadway projects infrastructure for connected and autonomous technologies (such as fiber optic lines), where appropriate.	Ongoing	WisDOT, Dane County, Local governments
B	Replace obsolete traffic signal controllers with “smart” controllers when replacing traffic signals or constructing new signalized intersections.	Ongoing	WisDOT, Dane County, Local governments
C	Implement adopted process to identify and integrate ITS infrastructure into planning and design of major state roadway construction projects.	Ongoing	WisDOT
5	Implement and periodically update the Regional Intelligent Transportation Systems Strategic Plan.		
A	Continue or initiate planning efforts to advance the recommendations listed in the ITS plan.	Ongoing	WisDOT, Dane County, Metro, Local governments
B	Continue efforts to provide comprehensive real-time traveler information to people and businesses.	Ongoing	WisDOT, City of Madison
C	Implement a smart card payment system that can be expanded to include a common fare media for other civic uses, as well as an open payment system that accepts fares using personal electronic devices.	Near Term	Metro
D	Investigate the feasibility, benefits, and costs of an expanded incident detection and response program for additional state roadways (e.g., Verona Road) and selected local arterials.	Near Term	WisDOT, City of Madison, MPO
6	Promote electric vehicle charging infrastructure to reduce greenhouse gas emissions.		
A	Conduct a regional electric vehicle charging infrastructure readiness assessment.	Near Term	MPO, Dane County, Utility providers
B	Support development of alternate fuel corridors.	Ongoing	WisDOT

Figure 4-e TSMO and Technology Recommendations and Supporting Actions (Continued from previous page)



Public Transit

The Metro Network Redesign project is taking place concurrently with the development of this Regional Transportation Plan. The transit element of this plan builds upon this planning effort to identify a long-term vision for a regional transit system. Map 4-e illustrates this future planned transit network. With implementation of the planned transit network, the number of average weekday boardings on the system is projected to increase by 72% percent from 59,200 to nearly 102,000 by 2050 with assumed growth, while the number of trips (excluding transfers) is projected to



grow from 54,500 to 94,300.¹⁹ This excludes supplemental school service ridership.

The future transit system shown in Map 4-e was developed in six steps.

1. BRT east-west and north-south corridors and local service extensions serve as the framework or core of the transit system;
2. Routes in the "Ridership Alternative" from the Metro Network Redesign, which focuses resources on frequent service on densely-developed corridors, were added²⁰;
3. Regional express routes to outlying communities, largely unchanged from the last RTP, were added;
4. Based on projected development by 2050 as included in the growth scenario developed for the Regional Development Framework and RTP, additional routes were added and/or service frequency was increased, including new BRT service connecting southwest and east Madison with the UW campus and downtown, extending N-S BRT south to the Fitchburg
5. The draft future transit system was reviewed with community planning and Metro staff; and,
6. Revisions were made to the network based on feedback from community planning and Metro staff.

It is important to note that the future transit system shown here is intended to inform local land use planning efforts and guide future transit service planning as well as gauge the impact on auto travel in selected corridors as part of the plan update; it is a concept plan, not a detailed service plan, in that routes do not necessarily include required turn-around points, and routes have not been evaluated for efficient running times.

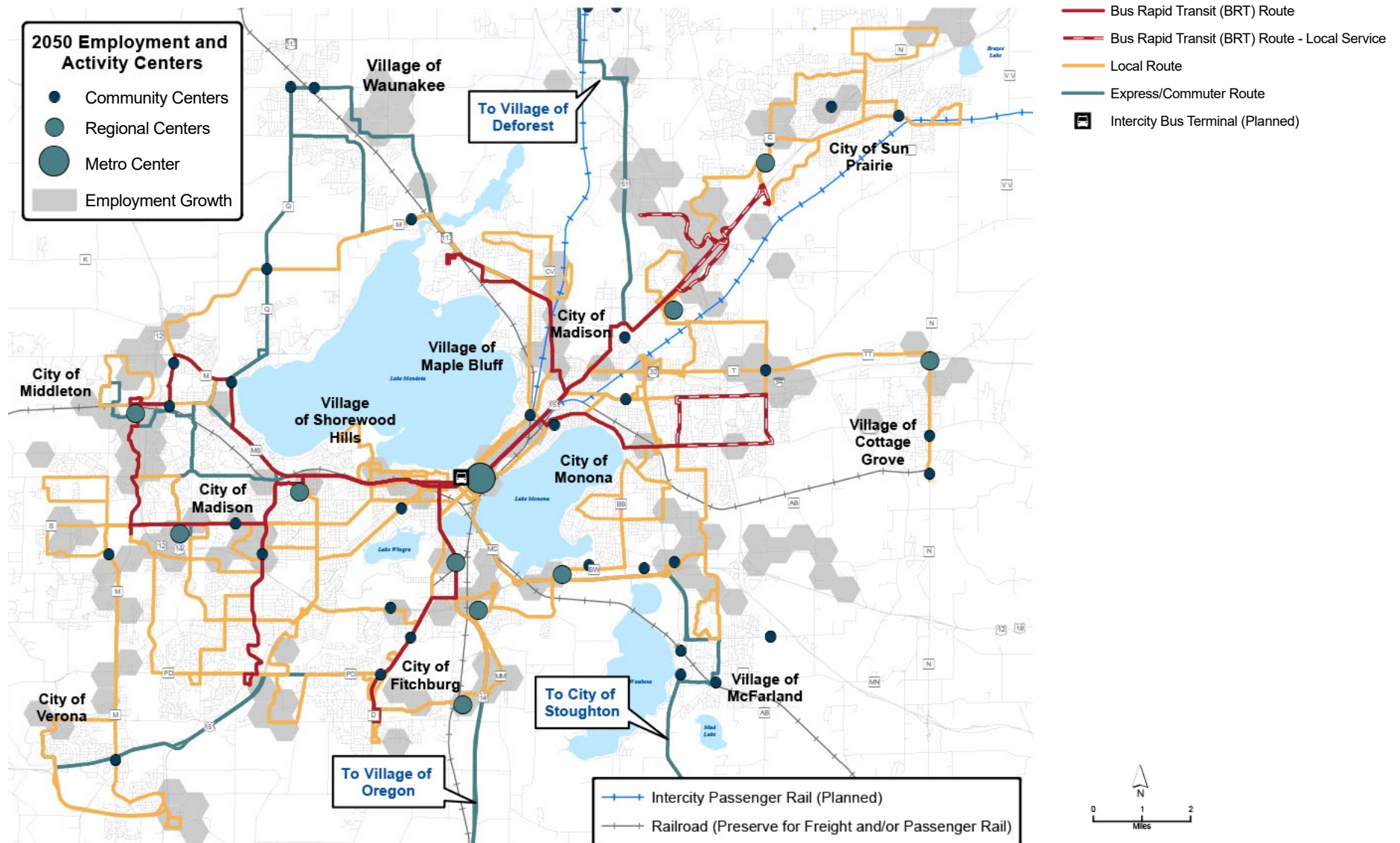
Map 4-f shows the planned transit network service frequency during the weekday peak periods. The frequent service network (15-minute service throughout the day) would be increased from five routes during peak periods and only one route mid-day to seven routes during the AM peak and eight routes for the remainder of the day. In addition to the number of routes providing frequent service, the mid-day frequent service network will

¹⁹ Travel model base year of 2016

²⁰ Due to differing schedules of the RTP Update and the Network Redesign, the RTP proposed future transit network was based on an alternative network that was designed in order to elicit feedback, not to be implemented. The Madison Transportation Policy and Planning Board (TPPB) directed staff to develop a draft transit network based on the Ridership Alternative with improved coverage; the proposed future transit network is consistent with that direction but does not incorporate most of the changes incorporated into the draft network currently being considered due to conflicting project schedules.

Future Planned Regional Transit Service Network

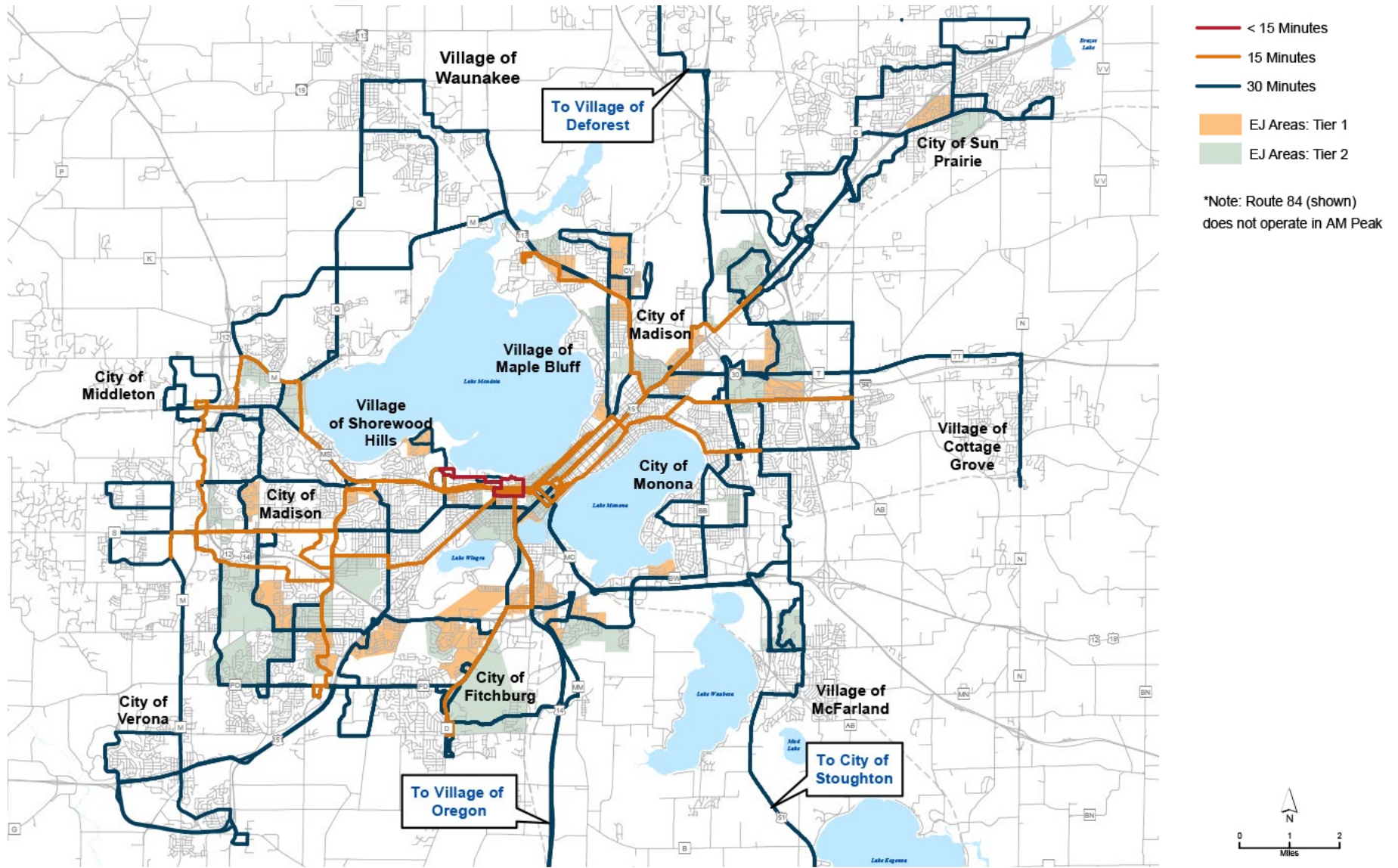
Madison Area, Wisconsin



Map 4-e Future Planned Regional Transit Service Network

Future Planned Regional Transit Network: AM & PM Peak Route Headways

Madison Area, Wisconsin



Map 4-f Future Planned Regional Transit Network: AM & PM Peak Route Headways

grow from 6 miles (mid-day)/42 miles (peak only) to 88 miles (all day) in length. With this expansion of frequent service area will come a marked increase in the number of jobs and households within ¼ mile of the frequent service network, as shown in Figure 4-f. The number of households within ¼ mile of the frequent service network will grow by 290%, and the number of jobs accessible on the network will grow by 185%. Map 4-g shows the number of buses per hour during the mid-day period under the planned transit network.

Jobs and Households within 1/4 Mile of the Frequent Service Network (15 min)

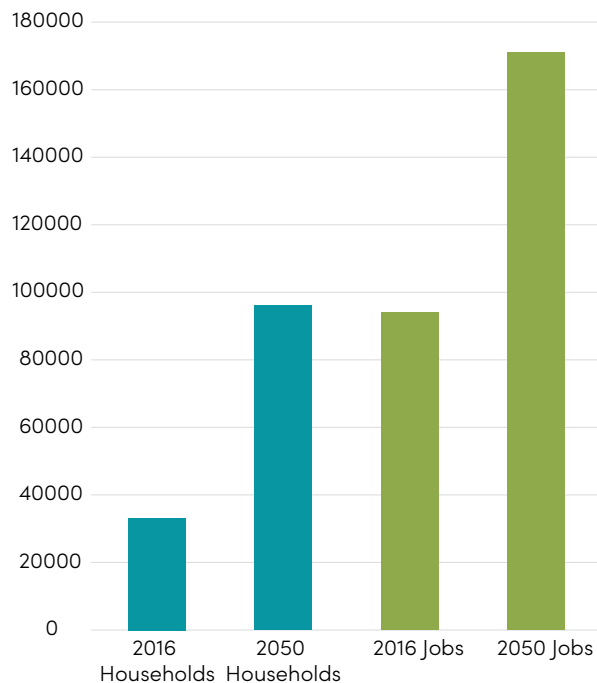


Figure 4-f Jobs and Households within 1/4 Mile of the Frequent Service Network (15 min)

While Maps 4-e through 4-g show the transit system vision, a new infusion of funding—for example through creation of a regional transit authority providing a dedicated funding source—will be needed to fully achieve this vision. For more information, see the Financial Analysis in Chapter 5.

IMPLEMENT A BUS RAPID TRANSIT SYSTEM AND RESTRUCTURE EXISTING ROUTES TO IMPROVE EFFICIENCY

Recognizing that BRT was a more cost effective, realistic high capacity transit service option for the Madison area due to its mid-size, the unlikelihood of securing grant funding for a rail project, and lack of a dedicated transit funding source, the MPO led the *Madison Transit Corridor Study* in 2013 in cooperation with Metro Transit, using funding secured by the Capital Area Regional Planning Commission through a Sustainable Communities grant. The study identified four corridors suitable for bus rapid transit (BRT). BRT elements identified in the plan include frequent, direct, limited-stop service, branded buses and stations with level boarding and off-board fare collection, and transit priority measures like bus lanes and transit signal priority. These corridor improvements would improve capacity and reduce travel times for transit riders throughout the Madison area. At the time, it was envisioned that capital costs could be funded in large part through a federal Small Starts grant. As was envisioned in 2013, the East-West BRT project is recommended for funding in part by a

federal Small Starts grant of \$80 million.²¹ The City of Madison is currently pursuing federal Areas of Persistent Poverty funding for planning the North-South BRT route. Map 4-h shows the proposed BRT system.

Concurrently with planning the East-West BRT system, Metro is engaged in a Transit Network Redesign. The Network Redesign is intended to improve transit equity throughout the region, to address long-standing service complaints regarding long travel times and transfers, confusing service, and rider safety. The BRT and Network Redesign projects acknowledge the effects of each other, but neither restricts the consideration of alternatives of the other project, and both projects have value with or without the implementation of the other.

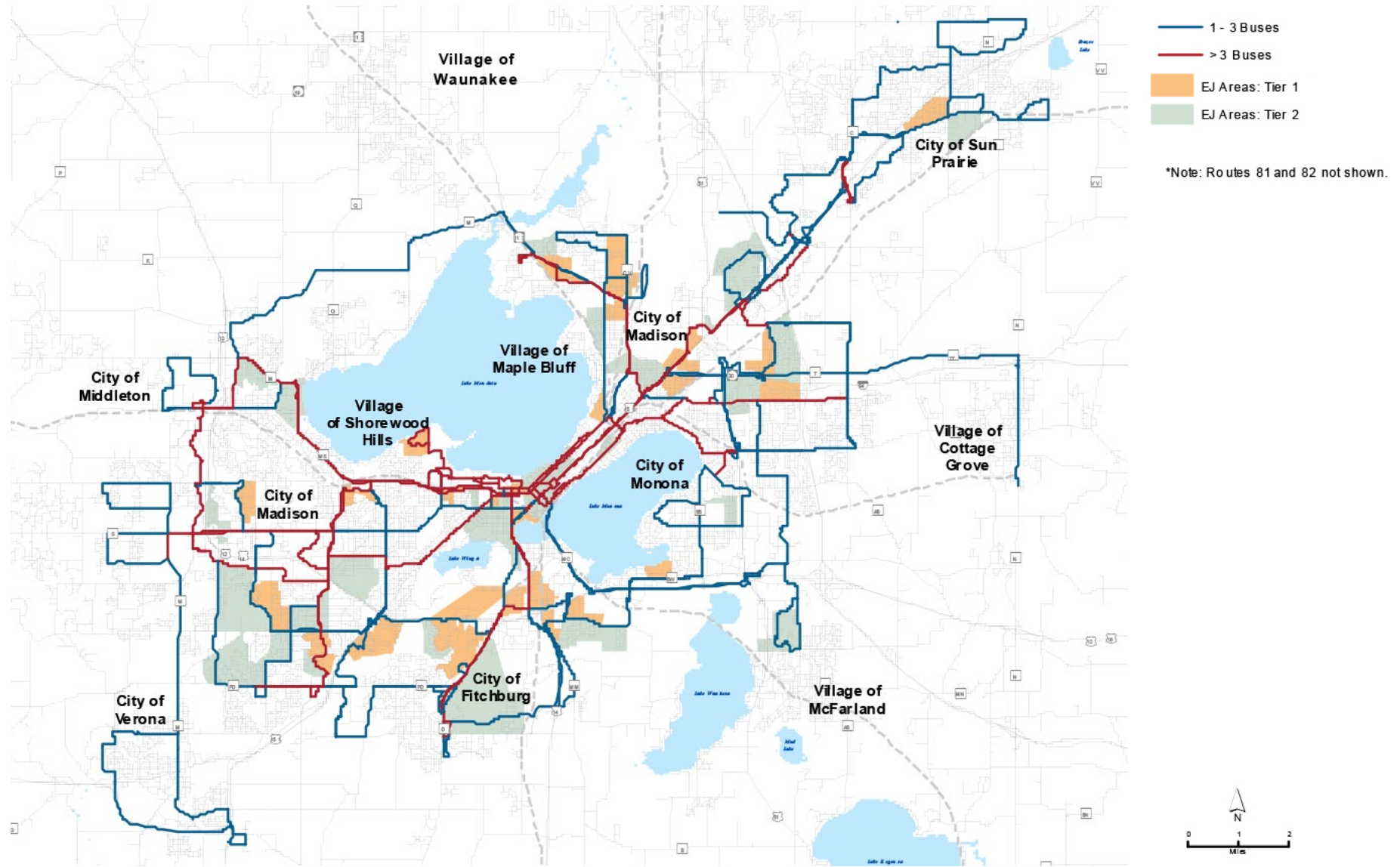
IMPROVE THE EXISTING LOCAL BUS NETWORK BY REDUCING TRAVEL TIMES, INCREASING FREQUENCY, INCREASING CAPACITY, IMPROVING SERVICE TO EJ AREAS, PROVIDING SERVICE TO NEW NEIGHBORHOODS, AND ENHANCING FIRST AND LAST MILE CONNECTIONS

With a growing service area and limited service outside peak periods and on weekends, transit travel times for longer distance trips are often not even close to being competitive with driving. Many cross-town trips take an hour or longer due to routing through neighborhoods and

²¹ <https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-05/FY22-Annual-Report-on-Funding-Recommendations.pdf>

Future Planned Regional Transit High Frequency Network (Mid-Day) Approximate Buses per Hour

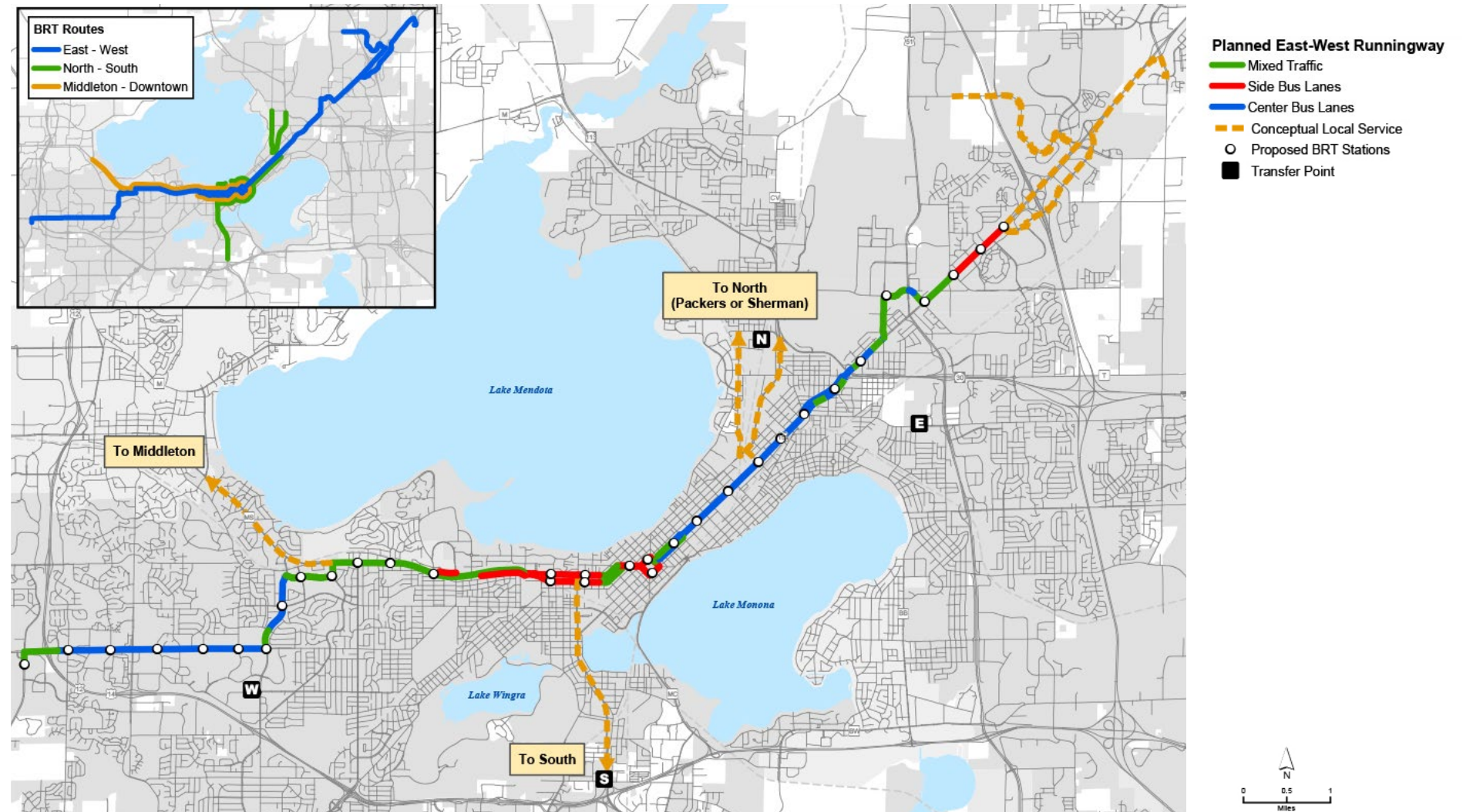
Madison Area, Wisconsin



Map 4-g Future Planned Regional Transit High Frequency Network (Mid-Day) Approximate Buses per Hour

Proposed East-West Bus Rapid Transit

Madison Area, Wisconsin



transfers. There is a need to shorten these trips, allowing riders to use faster, more direct service throughout the day. New performance measures with sustainable data sources should be adopted to measure success in achieving this recommendation.

Related to the need for reduced travel times is a need to increase the frequency of service in some parts of the network. High-frequency routes are generally defined as those in which a rider does not have to check a schedule before traveling to a transit stop – generally 15-minute service or better. Currently, a limited number of neighborhoods in the region are served with high-frequency service and are predominantly located in central Madison. High-density corridors need consistent, high-quality, frequent local all-day service. Such corridors include Monroe Street, Regent Street, Mills Street, Broom and Bassett Streets, and Atwood Avenue; other emerging corridors are being (re)developed so as to also warrant high-frequency service, including Cottage Grove Road, Parmenter Street, Century Avenue, University Avenue, Fish Hatchery Road, Park Street, and Main Street in Sun Prairie.

Along with frequency improvements, capacity improvements must be made on heavily traveled routes. Metro operates a fixed-route fleet of exclusively 40-foot transit coaches that seat about 35 and allow for about 20 standees. Pre-pandemic, several routes routinely suffered from overcrowded conditions, including instances where passengers were passed by because the

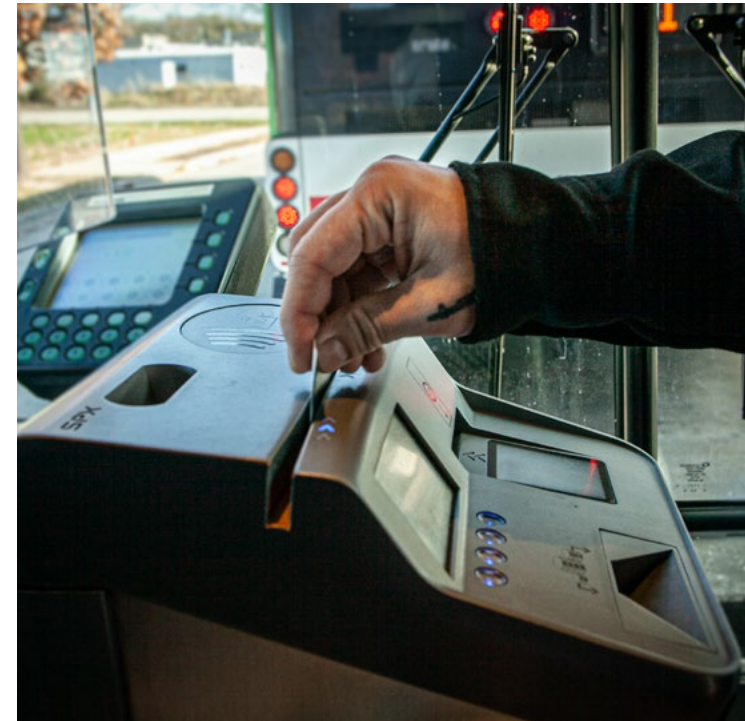
bus was full. Metro has used “extra” buses on routes with chronic overcrowding to provide additional capacity, but this strategy is costly due to doubling the number of drivers and vehicles in operation on those routes during peak periods. Metro is engaged in establishing a new bus storage and maintenance facility on Hanson Road, which will allow Metro to increase the number of buses in its fleet, introduce larger articulated buses, and accommodate future high-capacity transit, new all-day service, and regional routes.

Minority populations have historically experienced longer travel times and required more transfers to complete their trips than white riders have, with black riders being three times more likely to transfer than white riders.²² The 2021–22 Transit Network Redesign proposes a system²³ that improves transit access for the majority of area residents; minority populations will see improved access with the new system as well.²⁴ For in-depth review of transit and Environmental Justice populations, see Appendix C. Continual improvement in transit access for these populations will require ongoing data collection and targeted allocation of resources.

²² 2015 Metro On-Board Survey, <https://www.greatermadisonmpo.org/planning/documents/OBSExecutiveSummaryMPO.pdf> (p 12)

²³ The final proposed network, although still in development, will be based on the Ridership Alternative in the Metro Network Redesign Alternatives Report, <https://www.cityofmadison.com/metro/documents/network-redesign/Alternatives-Report-pt1.pdf>

²⁴ *ibid* (p 42)



When new neighborhoods are fully developed, full transit service should be provided with access to the rest of the urban area. Some neighborhoods in peripheral Madison, Middleton, Fitchburg, and Verona only have service during weekday peak periods and require service throughout the day to provide access to jobs outside the traditional first shift workday as well as trips serving other purposes. Sun Prairie arguably represents the largest need for all-day fixed-route bus service. With a 2020 population of about 36,000, Sun Prairie is currently served by a publicly subsidized shared-ride taxi system and a peak-period bus route (#23) with limited-stop service to downtown

Madison. While popular, the shared-ride taxi system is strained by the capacity limitations of serving one or two people at a time and does not provide a convenient and affordable trip to Madison. Sun Prairie is currently planning to replace route 23 service with a local service extension of the BRT system connecting to the Sun Prairie Park and Ride, and is investigating options for local bus service.

Finally, the transit system must be accessible for those that live and work near transit stops, but outside of reasonable walking distance. Connecting transit routes provide a good option, but their typical low frequencies and

circuitous routes, combined with transfers, drive up travel times. Further, they sometimes have low ridership and can be expensive to operate, providing relatively low utility to the community.

Alternative first mile/last mile strategies are emerging that may be viable alternatives to new fixed-route service in low-density, peripheral areas. Improving pedestrian and bicycle access to transit stops provides riders with increased access to the transit network. Bike-share programs like BCycle are an option but they require a high density of docking stations to be successful and are not an option for everybody, especially during cold and rainy weather.²⁵ Public shared-ride taxi systems and other rideshare schemes may be effective in low-demand areas.

Point-deviation routes have not historically been widely deployed in the Madison area, but with Madison's peripheral neighborhoods growing and stretching Metro Transit's resources, they may fill a limited niche. Point-deviation routes typically follow a route with a conventional schedule, but are allowed to deviate slightly in order to serve riders. Stops off the standard route must be requested in advance, and reservations are typically required to be submitted in advance – although routing software and real-time vehicle location tracking enable some systems to accommodate ride requests with very little advance notice. In low-density areas, point-

deviation routes have the potential to serve larger areas within a fixed budget compared to fixed routes.

In the example route shown in Map 4-i, a bus would travel between the Middleton Business Park and the South Ridge neighborhood along the dark orange line, but could make reasonable deviations to serve the light orange shaded area. Such a route may provide cost-effective all-day service to neighborhoods that currently have no all-day service, with reasonable travel times. The potential for application of this service model will be investigated in greater detail in the next Transit Development Plan update.

Other emerging first- and last-mile options include partnerships with transportation network companies such as Uber and Lyft; the provision of “mobility hubs” that offer bikeshare, kiss-and-ride facilities, park-and-ride facilities, transit access, and which are well-served by bicycle and pedestrian networks; and contracted services provided by private operators.

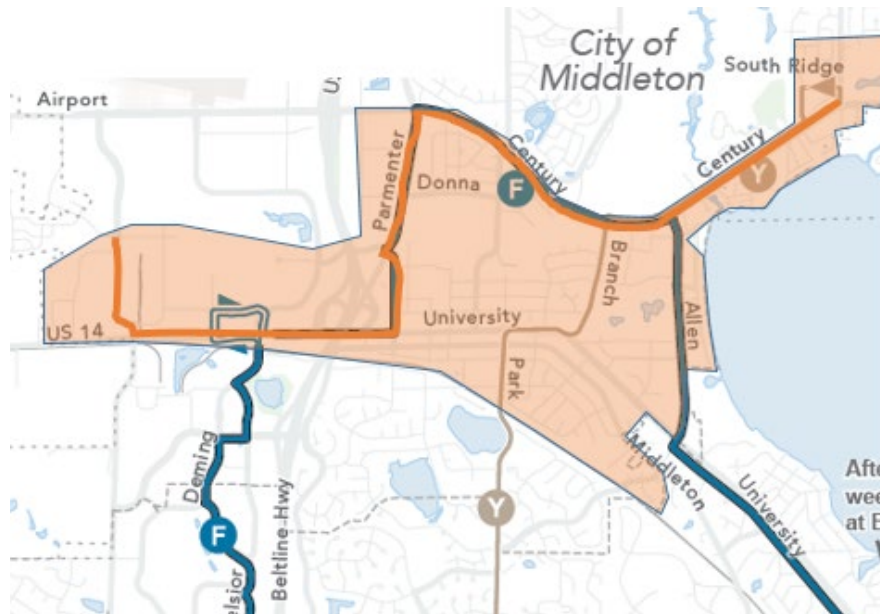
MANAGE AND IMPROVE THE QUALITY OF TRANSIT CAPITAL ASSETS

Aging infrastructure needs to be maintained and updated. Transit buses last 12 to 15 years and need to be replaced regularly. Metro currently uses an almost-entirely diesel-powered fleet, about 10% of which is hybrid diesel-electric; three battery-electric vehicles were added to the Metro fleet in 2021 and will enter service in 2022. Transitioning to a low-emission or emission-free fleet will improve



²⁵ BCycle closes its system in the winter, so these cycles are not available in some months even to those who would choose to ride them in inclement weather.

Hypothetical Middleton Deviated Route



Map 4-i Middleton Deviated Route

ridership, reduce Metro's dependency on petroleum fuel, and improve public health, air quality, and the pedestrian environment in bus route corridors. Metro adopted a comprehensive Transit Asset Management Plan in accordance with new federal rules in 2018. The plan covers all transit agency assets, including vehicles, facilities, equipment, and other infrastructure. New BRT infrastructure, including signal priority and other ITS infrastructure, dedicated bus lanes, off-board fare payment, and BRT stations, will be installed over the course of the next six to eight years in the east-west and north-south corridors, and will need to be maintained thereafter. In the long-term, additional BRT

routes with supporting infrastructure are planned, further adding to maintenance needs.

IMPROVE REGIONAL ACCESS TO THE TRANSIT NETWORK

Regional transit service in the Madison area is extremely limited with bus service confined to the contiguous municipalities bordering Madison, excluding McFarland, and Verona. Employees living in DeForest, Windsor, Waunakee,

Cottage Grove, McFarland, Stoughton, Oregon, and Cross Plains who work in the Madison area have effectively no public transit options outside of commuting to a park-and-ride lot or location within a community with service.

A new regional express service network will address the needs of people in these communities to commute to many jobs, particularly in central Madison. It will also provide access to people living within the existing transit service area to jobs in suburban employment centers. Employers in some of the communities have indicated they have difficulty filling entry level, lower wage jobs because of the lack of transit service. With

direct, limited-stop service within Madison, the regional service will be time-competitive with driving and carpooling. Further, by accessing the city center along active arterial streets, the express network will provide opportunities for new express service for commuters in Madison neighborhoods.

New park-and-ride lots will help supply passenger demand for the new regional express service. Many suburban communities are not well laid out for one route to serve all neighborhoods – many commuters will be best served if they have the option of making a short trip by auto or bicycle and using transit for the majority of their trip. Park-and-ride lots may be newly constructed, publicly owned lots, or private lots (e.g., at a shopping center) with lease agreements. The latter is preferable if those options are available.

TAKE STEPS TO ENSURE FINANCIAL SOLVENCY OF THE TRANSIT AGENCY

A regional funding mechanism, such as a regional transit authority with taxing authority, is likely necessary to fully implement the vision of expanded transit service in the Madison region. A regional governance structure would also allow for improved planning, service efficiency, and more equitable decision-making. Lacking enabling legislation for a regional transit authority, the City of Madison should work with existing and prospective service partners, including communities, UW, and large employers to develop sustainable and equitable cost sharing agreements.

Public Transit Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Implement a Bus Rapid Transit system.		
A	Complete project planning and design, leading to an initial BRT Project.	Short Term	City of Madison and other Local Governments, Metro, MPO
B	Complete project planning and design for the North-South (phase 2) BRT Project.	Short Term	City of Madison and other Local Governments, Metro, MPO
C	Expand the BRT network to fulfill the BRT Vision in the Madison area.	Mid-Term	Cities of Madison, Fitchburg, Middleton, and Sun Prairie; Metro, MPO
D	Expand the use of transit priority treatments, focusing initially on the BRT corridors.	Ongoing	Metro, MPO, Local Governments
2	Improve the local bus network by investing where needs are greatest.		
A	Continue to optimize the local bus network to maximize its utility with available resources and complement the BRT system.	Ongoing	Metro, MPO
B	Measure and monitor the effects of service changes on low-income and minority populations; prioritize service expansions and adjustments that serve the needs of these populations.	Ongoing	Metro, MPO
C	Improve integration with bordering transit systems.	Ongoing	Metro, MPO
D	Continue to improve the convenience and ability to navigate the transit system by reducing travel times and simplifying the service.	Ongoing	Metro
E	Expand and enhance the network of frequent local service.	Ongoing	Metro
F	Improve and expand data collection and analysis to support service planning and track achievement of Performance Measures.	Ongoing	Metro, MPO
G	Prioritize improving or providing new service in corridors that are supportive of transit (i.e. high ridership potential).	Ongoing	Metro, MPO
H	Plan service changes with guidance from affected communities to ensure that route alignments and service hours will be useful for potential riders.	Ongoing	Metro, MPO
I	Measure outcomes of service changes and adjust service planning to continue to prioritize transit access for transit-dependent populations.	Ongoing	Metro, MPO
J	Adopt new Performance Measures with sustainable data sources to track progress in achieving network improvement as described in this section.	Short Term, then Ongoing	MPO

Figure 4-g Public Transit Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Add service in developing neighborhoods.		
A	As developing neighborhoods become built out, enhanced limited-service routes so that they provide regular service throughout the day.	Mid-Term, Ongoing	Metro, Local governments
B	Add new all-day service in unserved peripheral neighborhoods and suburban communities such as Sun Prairie, McFarland, and Verona.	Mid- to Long-Term	Metro, Local governments
4	Enhance transit stops with improved pedestrian/bicycle access and amenities.		
A	Coordinate with municipalities, businesses, and neighborhood associations to plan and provide funding for stop improvements.	Ongoing	Metro, MPO, Local governments
B	Utilize TID funding and other alternative financing mechanisms to fund stop improvements.	Ongoing	Local governments
C	Plan and reserve space for transit stops/stations as part of new developments where appropriate.	Ongoing	Local governments
5	Explore alternative service delivery models to serve low-demand areas.		
A	Analyze bus route productivity and identify service with low use and high travel times that may better serve neighborhoods with alternative transit models.	Short Term	Metro, MPO
B	Evaluate the potential for peripheral routes with small vehicles that can deviate from their route with the goal of providing service in low density areas at a lower cost and reducing multiple-transfer trips.	Short Term	Metro, MPO, Private Providers, Non-Profits
C	Investigate using transportation network companies and shared-ride taxi service to connect to transfer points, BRT, and regional express service.	Short Term	Metro, MPO, Private Providers, Non-Profits
D	Plan for the use of driverless shuttles in low-density transit markets and niche areas like business parks and campuses.	Short Term	Madison Traffic Eng, UW, Metro, MPO
6	Maintain, expand, and enhance bus rolling stock and supporting facilities.		
A	Renovate and remodel the existing Metro maintenance/bus storage facility and address maintenance issues.	Near Term	Metro
B	Build a new satellite bus facility to accommodate a larger fleet, including articulated buses and electric buses.	Near Term	Metro
C	Replace buses on a regular cycle to ensure reliability and comfort.	Ongoing	Metro
D	Expand the use of electric vehicles with a goal of having a fully electric fleet by 2050.	Ongoing	Metro
E	Introduce articulated 60-foot buses to the fleet to reduce overcrowding and accommodate BRT.	Ongoing	Metro

Figure 4-g Public Transit Recommendations and Supporting Actions (Continued from previous page, continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
7	Implement a regional express bus network.		
A	Expand and optimize the existing regional express service.	Ongoing	Metro, Local governments, MPO
B	Operate new routes to suburban Madison communities primarily when they will be of use to local commuters, which may be during the morning and afternoon peak periods or which may correspond to multiple daily shifts.	Mid-Term	Metro, Local governments, MPO
C	Optimize the regional express transit service to provide service from Madison to suburban job centers as well as from residential areas to central Madison.	Mid-Term	Metro, MPO, local governments
D	Provide limited stops within City of Madison limits to provide fast service within Madison and connections to BRT and local service.	Mid-Term	Metro, Local governments
8	Expand park-and-ride facilities in conjunction with BRT and express services.		
A	Investigate opportunities for use of space at shopping centers, churches, and other private facilities as well as public facilities such as parks, where appropriate. See Map 4-n, Planned Future PNR System.	Ongoing	Metro, MPO, Local governments
B	Explore partnerships with local communities and agencies to maintain park-and-ride facilities.	Ongoing	Metro, Local governments
9	Take steps to ensure financial solvency of the transit agency.		
A	Ensure that funding for transit remains equitable and that decisions are made fairly, with communities represented appropriately.	Ongoing	Metro, Local governments
B	Explore alternatives to supplement or replace the property tax for local public funding, including a vehicle registration fee and sales tax (if state enabling legislation passed).	Near Term	Local governments
C	Implement a new regional transit authority or district with the mission of providing regional transit service if state enabling legislation is passed.	Mid-Term	Metro, Local governments
D	Explore the potential for alternate or emerging funding tools to ensure the long-term financial sustainability of the regional transit system.	Mid-Term	Metro, Local governments, MPO, WisDOT, Private employers

Figure 4-g Public Transit Recommendations and Supporting Actions (Continued from previous page)



Specialized Transit

Specialized transit services are coordinated to meet the transportation needs of seniors, disabled individuals, those with low incomes, or other unique groups such as veterans. The *Coordinated Public Transit – Human Services Transportation Plan*,²⁶ updated in 2019, provides more details on the existing services and service and coordination needs. The following highlights some of these needs and recommendations to address them. See figure 4-h for Specialized Transportation Recommendations and Supporting Actions.

EXPAND THE COVERAGE OF ACCESSIBLE FIXED-ROUTE, PARATRANSIT, AND ON-DEMAND TAXI SERVICES

The expansion of public all-day fixed-route bus service into unserved and underserved neighborhoods in peripheral Madison and neighboring communities like Verona, Monona, and Sun Prairie will allow people with special needs to travel in a safe and efficient way. The bus service will be wheelchair accessible and come with complementary paratransit service for those unable to use the fixed-route bus service.

²⁶ https://www.greatermadisonmpo.org/planning/documents/2019_CoordinatedPlan_FinalForWeb.pdf

Other paratransit or specialized transit service must continue to expand to those outside the bus and associated paratransit service areas. Wheelchair accessible county-wide taxi service is currently only provided by one taxi company,²⁷ and the cost to provide the service is high at a time when transportation network companies such as Uber and Lyft have introduced new challenges to established transportation providers remaining financially solvent. Wheelchair accessible shared-ride taxi service is available in Sun Prairie and Stoughton.

²⁷ Union Cab Cooperative

EXPAND WORKFORCE TRANSPORTATION FOR LOW-INCOME WORKERS

Low-income workers will continue to struggle to find reliable ways to get to work and help drive the economy. The YWCA's JobRide program plays a crucial role in filling this niche when public transit options are not available or practical. However, demand for the service exceeds budgetary and physical capacity of the system, and as outlying communities grow, demand will grow as well. Public and private, employer-sponsored vanpools offer another potential option for workforce transportation. See the TDM section of this chapter for more information.



LEVERAGE EMERGING TECHNOLOGIES TO LOWER OPERATING COSTS AND EXPAND TRAVEL OPTIONS

Emerging technologies, such as ridesharing service and autonomous vehicles, provide not only challenges to existing service delivery methods, but also opportunities for the future. New technologies must not be shied away from but embraced as they become proven service delivery models. Policies supportive of these technologies must be adopted and funding made available for private, non-profit providers to implement them.

CONTINUE EFFORTS TO BETTER COORDINATE SPECIALIZED TRANSPORTATION SERVICES

The City of Madison and Dane County coordinate successfully, minimizing service duplication. However, with the numerous public and private agencies and programs providing services there are still major coordination needs as documented in the *Coordinated Public Transit – Human Services Transportation Plan*. This includes not only coordinating transit service, but coordinating services such as job training and transit, eligibility requirements, and funding. In addition, local communities must consider

transit service availability when siting senior housing, medical facilities, and other services.

ENHANCE MARKETING, OUTREACH, AND EDUCATION FOR SPECIALIZED TRANSPORTATION SERVICES

During the 2019 MPO-organized Specialized Transportation Conference, widespread lack of knowledge of available transportation services and programs was identified as a barrier to effectively serving eligible populations. Focus groups held as part of the public engagement for this RTP Update in 2021 reiterated this lack of information, and a Cambridge Senior Resource Network survey²⁸ conducted in 2020–21 documented the extent of the knowledge gap, with transportation services being the least-used and yet some of the most-desired services by respondents. The MPO-funded Dane County Transportation Services call center, currently staffed by one person, will be integrated with the Aging and Disability Resource Center (ADRC) call center in 2022, greatly increasing opportunities for transmitting this information to eligible riders.

²⁸ <https://dane.legistar.com/View.ashx?M=F&ID=9314362&GUID=3129C726-C7EC-4D94-A1A2-F2E5F8B3B8D7>



Specialized Transit Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Expand the coverage of accessible fixed-route bus and paratransit service and address other identified service related needs.		
A	Update the Transit Development Plan, which will build on the Network Redesign Study to identify priority service improvements or expansions requiring additional service hours, and then implement the recommendations. Also, address needs identified in the Coordinated Public Transit - Human Services Transportation Plan.	Ongoing	Metro, MPO, local governments
B	Explore opportunities to expand paratransit or accessible shared-ride taxi service in urban areas beyond the fixed-route bus service area.	Mid-Term	Metro, MPO, Dane County, local governments
2	Work collaboratively with private taxi operators to ensure accessible taxi service is available and costs for the service are shared equitably.		
A	Work collaboratively with private taxi operators to ensure accessible taxi service is available and costs for the service are shared equitably.	Ongoing	MPO, City of Madison, Private taxi operators, Non Profits
3	Continue and expand specialized workforce transportation for low-income people.		
A	Work with the YWCA to ensure funding remains available for people to get to work who don't have traditional options.	Ongoing	MPO, City of Madison, Dane County, YWCA
B	Continue to maximize efficiency by optimizing vehicles and timetables.	Ongoing	YWCA
4	Leverage emerging technologies to lower operating costs and expand travel options.		
A	Modify policies as needed to ensure that autonomous vehicles can operate for seniors and people with disabilities.	Mid-Term	MPO, City of Madison, WisDOT
B	Use emerging technologies such as rideshare and routing software to improve coordination of trips between multiple providers.	Near Term	MPO, City of Madison, Dane County, transportation providers
5	Improve interagency coordination of the various specialized transportation services and private services.		
A	Improve coordination of medical trips, including inter- and intra-community trips and from surrounding counties.	Near Term	MPO, City of Madison, Dane County, medical providers, transportation providers
6	Expand efforts to educate potential riders about existing services.		
A	Initiate and continue marketing campaigns to spread knowledge about existing transportation services through community partners, senior focal points, service agencies, and other stakeholders.	Near Term	MPO, City of Madison, Dane County, senior focal points, service agencies, residential care facilities

Figure 4-h Specialized Transit Recommendations and Supporting Actions



Bicycles

Although the region's bikeway network is well developed compared to peer metropolitan areas, gaps in the network persist, particularly outside the central Madison area. For some important corridors, on-street bicycle facilities may exist, which is important, but in order to substantially increase the share of trips made by bicycle, a connected low traffic stress network must be provided. The low stress network provides for the needs of cyclists of all abilities, including young and old people, people with low to moderate cycling ability, people who are not comfortable biking in high-speed, high-volume traffic conditions, and others who demand low traffic stress facilities.

The [2015 Bicycle Transportation Plan for the Madison Metropolitan Area](#) identified streets that do not have bicycle accommodations or have insufficient bicycle accommodations in the Bicycle Network Plan. However, as these facilities are generally evaluated when opportunities arise, such as during street reconstructs, they were not prioritized. The 2015 Plan did prioritize a set of regional shared-use path projects. The 2050 RTP went one step further and identified missing facilities that represented major gaps and barriers in the bikeway network, including both street corridors and gaps in the urban area off-street network. In 2018, the MPO published the [Dane County Bicycle and Pedestrian Crash Study](#), which documented

the frequency, type, and severity of bicycle and pedestrian crashes in order to develop appropriate countermeasures. [Defining the Madison Area Low-Stress Bicycle Network and Using it to Build a Better Regional Network](#), which documents the MPO's data-driven approach to evaluating traffic-related stress on bicycle routes, was also published by the MPO in 2018. This report, and the continued application and refinement of the methodology behind it, facilitated the identification of high-stress facilities that serve as barriers or gaps in the low-stress network. The 2021 [Pedestrian and Bicycle Facility Requirements, Policies, and Street Standards](#) report details locally-adopted bicycle and pedestrian facility requirements along with national recommendations and best practices to help local planning and engineering staff and elected officials make informed decisions regarding development and design standards, and to give them tools to make roadways safer for all users. A "living" addendum to this report was released in October 2021, and will be updated on an ongoing basis.

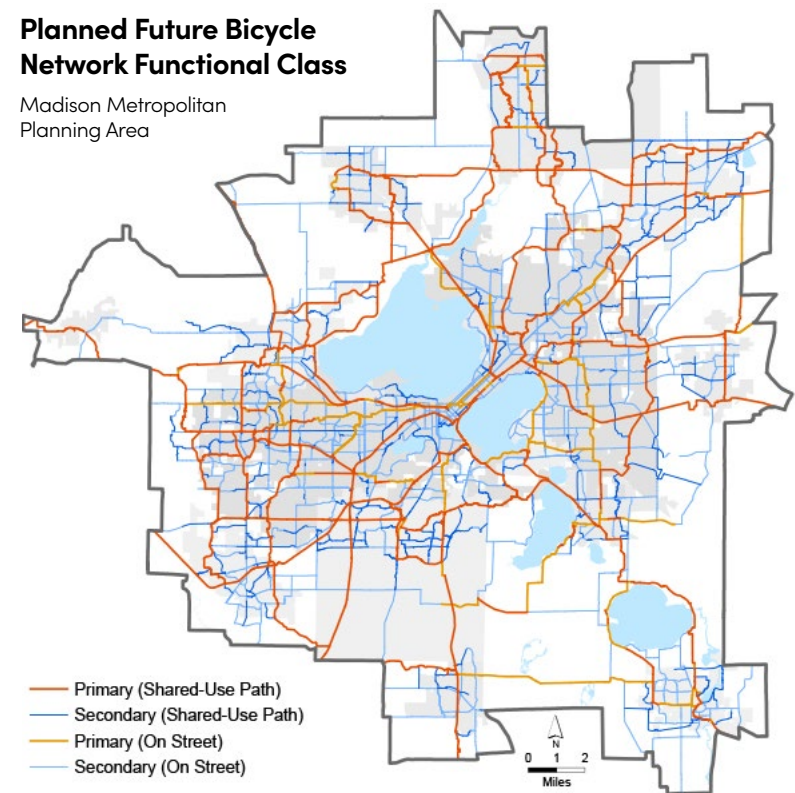
This update to the 2050 RTP builds on these prior planning and research efforts

by updating the planned regional bicycle network, the "missing links" analysis of gaps and barriers in the bikeway network, the identification of priority regional paths, and the complete bicycle facilities plan. It also incorporates new data collection capabilities.

Map 4-j shows the planned regional bikeway network with primary routes in red (off-street) and orange (on-street) and secondary routes in dark blue (off-street) and light blue (on-street). Primary routes generally serve longer trips and connect regional destinations

Planned Future Bicycle Network Functional Class

Madison Metropolitan Planning Area



Map 4-j Planned Future Bicycle Network Functional Class

and communities, while secondary routes fill in gaps in the network and tend to serve shorter trips and more local destinations. They also include some arterial roadways with higher traffic volumes that are equipped with bike facilities. Figure 4-i lists Bicycle Recommendations and Supporting Actions.

REDUCE BARRIERS TO BICYCLING

Reducing the physical, economic, and safety-related barriers to biking is the best way to increase the number of people willing to travel by bike.

Missing links, shown in Map 4-k are the most important locations where key routes on the low-stress bike network are interrupted by high-stress intersections or road segments, or where a new connection is needed to bridge an existing gap in the network; and where fixing these issues is a critical need to serve existing development.

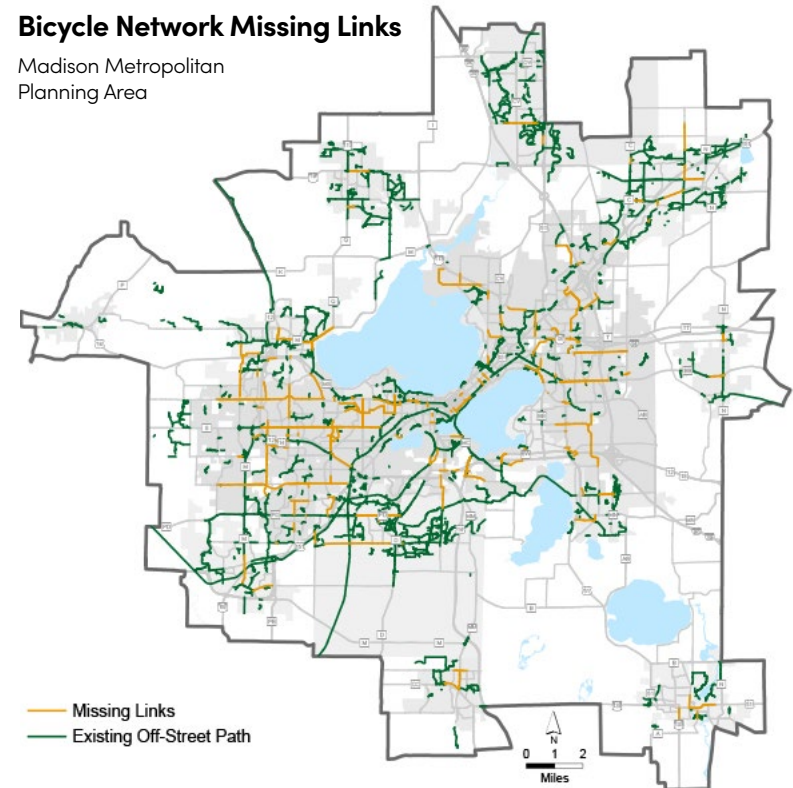
Planned regional paths not classified as missing links are generally intended to connect communities or serve developing or planned neighborhoods. In contrast, the missing link analysis is focused on identifying corridors with existing demand for bicycling where high traffic stress or route circuitry create barriers to bicycle use, and where new or improved bicycle facilities could be added when the opportunity arises. The analysis is intended to serve as an initial screening based on the existing and planned bikeway network. A more detailed engineering evaluation is needed to determine how best

to accommodate bicycles within the corridors identified. While a detailed feasibility analysis of the identified corridors was not conducted, constrained street corridors with no available right-of-way and/or recently reconstructed streets are excluded.

Addressing missing links in the bicycle network will help complete the bicycle route system envisioned in the *Bicycle Transportation Plan*. High-stress roadways can often be remedied with new side paths or bike lanes—conventional, buffered, or protected. Where road network circuitry inhibits direct travel by bike, new path or road connections can offer cyclists new short cuts that make travel by bike faster and more efficient.

Similarly, ongoing efforts to improve intersection safety and local street network connectivity, and reduce conflicts between bikes, pedestrians, and transit and delivery vehicles will help to reduce bicycle traffic stress and make bicycling a more appealing option across the metropolitan area.

Economic barriers present another obstacle to increasing bicycle usage. In addition to the cost of a bicycle, helmet, maintenance, lights,



Map 4-k Bicycle Network Missing Links

lock, and weather-appropriate clothing, four state-owned trails in the Madison area – the Military Ridge State Trail, the Badger State Trail, the Glacial Drumlin State Trail, and portions of the Capital City State Trail – require bicyclists to carry a permit. While the fees for state trail passes help pay for trail maintenance and new construction, they also pose a barrier to entry and negatively impact transportation equity. For potential users who either lack the ability to purchase their passes online or cannot afford the \$25 annual or \$5

daily pass, these facilities may as well not exist. Local governments, the county, and the MPO should work with the Wisconsin State Park System to explore alternate funding mechanisms that would allow these facilities, which are critical components of the regional bicycle network, to be used by bicyclists free of charge.

EXPAND THE REGIONAL SHARED-USE PATH NETWORK AND EXPAND ON-STREET ACCOMMODATIONS

The *Bicycle Transportation Plan* described a network of major regional shared-use paths that will connect communities with high quality biking infrastructure. Examples of regional paths include the popular Capital City Trail, Southwest Path, Ice Age Junction Path, and Lower Yahara River Trail. Typically long and continuous, they connect communities and regional destinations and often serve as high-volume bike arteries in the Madison area.

The Lower Yahara River Trail opened to the public in 2017 with a new bridge and boardwalk over Lake Waubesa, substantially shortening and easing a bicycle trip between Fitchburg or central Madison and McFarland. This trail is planned to be extended about 10 miles south to Stoughton. Dane County and local communities have made progress in implementing parts of the North Mendota Trail that will provide a path around Lake Mendota. A large portion of the trail will be built as part of the MPO funded County Trunk Highway M reconstruction project in 2023-'24.

The City of Madison, Village of Cottage Grove, and Dane County have been working to close the gap between the Capital City Path in Madison and the Glacial Drumlin Trail in Cottage Grove, creating a complete route between Madison and Milwaukee.

Other major recommended regional paths will link DeForest, Windsor, Sun Prairie, Oregon, and Cross Plains to the Madison area's existing path network and provide a new route around the north side of Lake Mendota. These paths are in various stages, with some segments complete, others programmed for construction, and others still in conceptual stages. They will address major regional deficiencies in the bike network, connecting communities that are currently isolated for people travelling by bike.

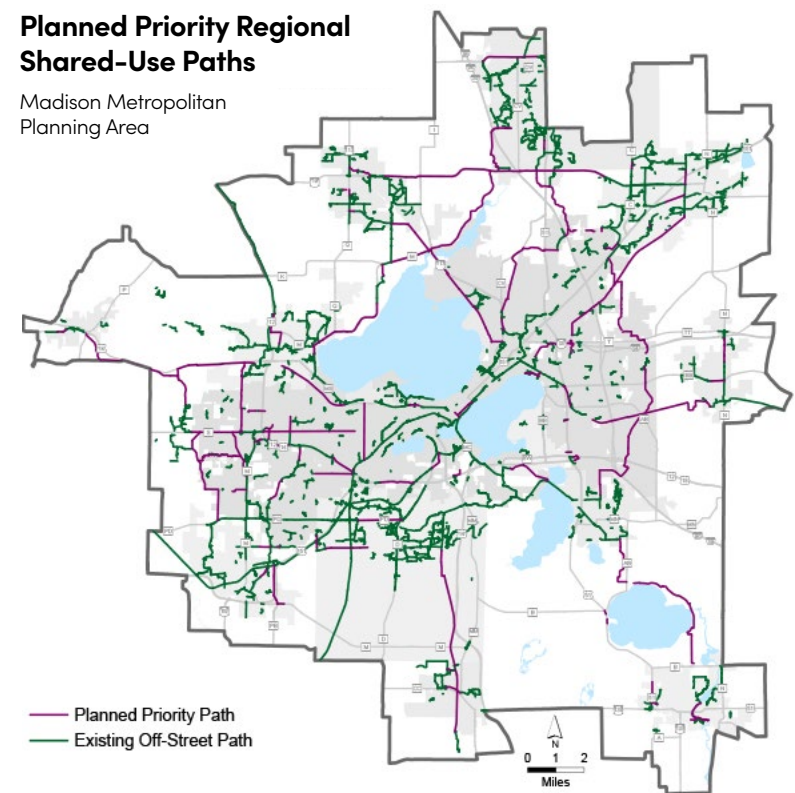
On-street accommodations for bicycles are found on a number of regional roadways, such as arterials and collectors that serve high volumes of motor vehicle traffic. In many instances, these facilities provide the most direct route to and from a variety of destinations. Providing safe on-street bicycle facilities ensures that more riders are able to comfortably ride on these regional roadways. The network should be expanded

as roadway reconstruction projects occur and facilities should be considered whenever new arterial or collector streets are constructed.

Map 4-I illustrates the major regional priority shared-use path projects that will help complete the planned regional network and fill important gaps in the urban area network (see Figure A-e in Appendix A for project listing). Many of these projects will remedy missing links in the bicycle network, while others will provide the first off-street routes linking suburban communities to the Madison

Planned Priority Regional Shared-Use Paths

Madison Metropolitan Planning Area



Map 4-I Planned Priority Regional Shared-Use Paths

area path network. Some planned priority paths may be constructed as protected on-street facilities, where conditions make off-street facilities infeasible.

ENCOURAGE BICYCLING BY ENACTING BICYCLIST-SUPPORTIVE POLICIES AND IMPROVING BICYCLIST SAFETY

To ensure that users of all ages and abilities are comfortable using the bicycle network, appropriate facilities must be provided, and both cyclists and motorists must be provided with ample education and encouragement opportunities. Other user needs include adequate bicycle storage opportunities, access to bike sharing services, end-of-trip facilities such as showers and lockers for bicycle commuters, and adequate wayfinding signage.

Bicycle Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Reduce barriers to bicycling.		
A	Evaluate roadways and intersections with a history of bike crashes, near misses, bike safety concerns/complaints, or designs known to create safety issues and plan and implement improvements.	Ongoing	WisDOT, Dane County, local governments
B	Plan for and complete the local collector street network where barriers prevent direct travel.	Ongoing	Local governments
C	Reduce conflicts between bikes and buses, delivery trucks, and pedestrians.	Ongoing	Local governments
D	Eliminate the state trail pass requirement for Wisconsin State Park System trails.	Near-Term	Wisconsin State Park System, Dane County, local governments, MPO
2	Expand the bikeway network with new shared-use paths and on-street facilities.		
A	Construct new off-street shared-use paths and on-street facilities to complete the planned bikeway network, focusing on filling missing links in the low stress network as identified in Map 4-k and completing regional priority paths connecting communities and major destinations.	Ongoing	Dane County, Local governments
B	Construct new shared-use paths in developing neighborhoods so that the land is secured and facilities are available as soon as new residents move in.	Ongoing	Dane County, Local governments
C	Retrofit existing corridors like railroad and utility rights-of-way with bicycle facilities as appropriate.	Ongoing	Local governments
D	Provide enhanced or premium bicycle facilities in key urban arterial corridors within right-of-way where feasible.	Ongoing	Local governments
E	Expand the use of bicycle boulevards, bicycle priority streets, and other priority or bicyclist protection treatments such as at intersections.	Ongoing	Local governments
F	Prepare and implement local bicycle plans.	Ongoing	Local governments
G	Include wide paved shoulders on rural highways where appropriate and economically feasible.	Ongoing	WisDOT, Dane County

Figure 4-i Bicycle Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Maintain and modernize existing bicycle facilities.		
A	Repave and repair bicycle facilities on a regular, data-driven basis to provide safe and comfortable riding surfaces.	Ongoing	WisDOT, Dane County, local governments
B	Include bicycle facilities on new bridges and highway crossings that may have bicycle traffic in the future, recognizing the very long lifespan of these facilities.	Ongoing	WisDOT, Dane County, local governments
C	Use innovative bike facility designs that meet or exceed state and national guidelines.	Ongoing	Local governments
D	Develop and implement local policies and practices to clear snow, ice, and debris from bike facilities.	Ongoing	Dane County, Local governments
4	Provide adequate bicycle parking.		
A	Require bicycle parking as a condition of new development.	Ongoing	Local governments
B	Provide public bicycle parking in business districts, on campuses, and at high-use transit stations.	Ongoing	Local governments
C	Provide end-of-trip bicycle amenities and facilities such as indoor/heated storage, bicycle repair facilities and services, showers, and lockers to support bicycle commuters.	Ongoing	Local governments, employers, developers, non-profits
5	Improve bicyclist safety.		
A	Conduct studies of intersections and other areas with high crash rates, near misses, or documented safety issues to identify appropriate countermeasures.	Ongoing	Local governments, MPO
B	Update the MPO study of vehicular crashes involving pedestrians and bicyclists to obtain up-to-date information on common patterns for crashes. Utilize the information in crash prevention efforts.	Near-Term	MPO, City of Madison Traffic Engineering
C	Research and adopt innovative safety treatments.	Ongoing	WisDOT, MPO, local governments
D	Support local efforts to identify corridor level systemic safety improvements, and work with WisDOT to identify changes to safety program criteria to allow funding of such projects.	Near-Term	WisDOT, MPO, local governments
6	Continue bike share, education, and bicyclist supportive policies.		
A	Continue supportive policies like producing bicycle maps and accommodating bicycle-themed events.	Ongoing	MPO, Local governments, NGOs
B	Implement wayfinding system for bicyclists using the Bicycle Wayfinding Design Guidelines for Dane County.	Ongoing	Dane County, Local governments
C	Plan for, support, and implement the strategic expansion of the bike share program by increasing the coverage area and the density of stations, as well as exploring potential year-round operation.	Ongoing	BCycle, Local governments, MPO
D	Support and expand education and encouragement programs that promote safety and encourage all residents to bicycle for commuting and other trips.	Ongoing	MPO, Local governments

Figure 4-i Bicycle Recommendations and Supporting Actions (Continued from previous page)



Pedestrians

Sidewalks provide many benefits, including safety, mobility, and healthier communities. Sidewalks, along with street crossing facilities, such as curb ramps, crosswalks, signals, and grade-separated crossings, are the building blocks of the pedestrian transportation network. Safe and convenient street crossings are critical parts of pedestrian-friendly environments, as those are the primary locations of conflict with motor vehicles. Street crossings are also the most common place for pedestrians to get on or off sidewalks. Accessible curb ramps and safety features are necessary so that disabled people and others with limited mobility can access the pedestrian network.

The highest priority locations for new sidewalks and crossing facilities in developed areas include:

- Urban arterial and collector streets where sidewalks are missing from one or both sides, and are needed to serve existing development
- Pedestrian barrier crossings identified as deficient in the Pedestrians section of Chapter III
- Other locations where a lack of accessible street crossing facilities or sidewalk gaps significantly limit the utility of the existing network.

Installing sidewalks and crossing facilities as land is developed is the easiest and most efficient way to ensure that the pedestrian

network continues to expand to keep pace with community growth.

Appendix G includes a pedestrian toolbox that illustrates the different types of pedestrian facilities and treatments that can be used to encourage walking and improve pedestrian safety. Of course, good facilities alone are insufficient to encourage walking without destinations nearby, or if the streetscape is uninviting. Pedestrian supportive land use is addressed in the Land Use and Transportation Integration section. Figure 4-j lists major pedestrian facility recommendations with supporting actions to address them.

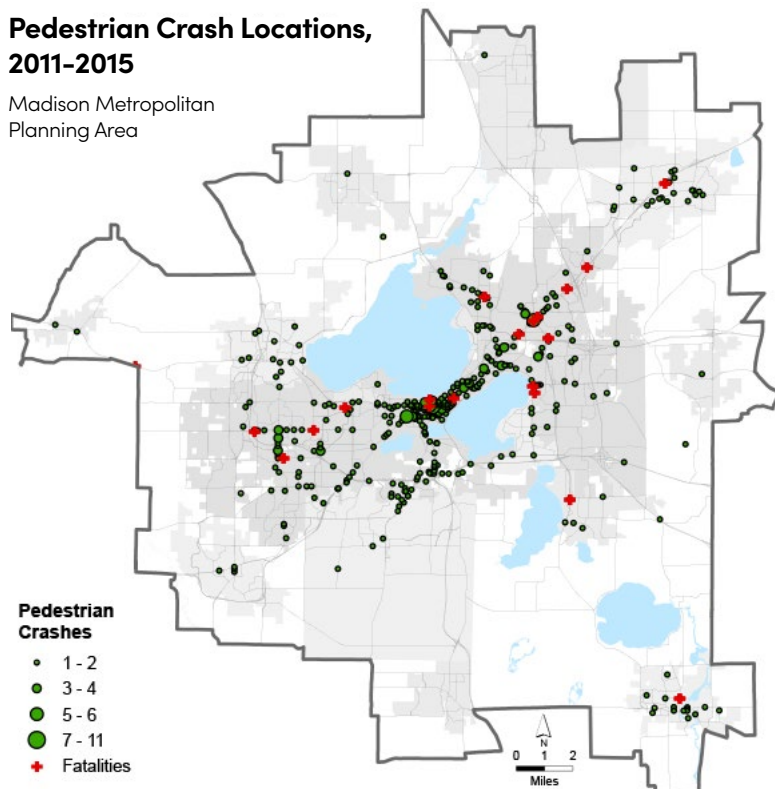
CONSTRUCT SIDEWALKS ALONG ALL NEW URBAN STREETS AND RETROFIT REGIONAL ROADWAYS WITH ACCESSIBLE PEDESTRIAN ACCOMMODATIONS

All urban streets other than some limited-access and grade-separated roadways should have at least one sidewalk; two if there are destinations on both sides of the road. Sidewalks and other pedestrian facilities need to be designed to provide accessibility to all pedestrians, including people with disabilities and older adults. People with physical impairments and older adults have a wide range of abilities and needs, and often travel by foot as their primary mode of



Pedestrian Crash Locations, 2011-2015

Madison Metropolitan Planning Area



Map 4-m Pedestrian Crash Locations, 2011-2015

transportation and/or connection to public transit. Just as we design roadways for use by a wide range of vehicles, we should design sidewalks, walkways, crossings, signals and other types of facilities for use by a wide range of pedestrians.

IMPROVE THE SAFETY AND USABILITY OF THE PEDESTRIAN NETWORK

At the beginning and end of every trip, users of all modes are pedestrians. Thus, it is important to ensure a safe and usable pedestrian network. High conflict intersections should be examined and potential pedestrian crossing improvements evaluated when appropriate. Map 4-m illustrates the location of many of these high conflict intersections. Sidewalks need to be maintained for year-round use, similar to that of roadways. In areas where roadway geometry and street designs cause unsafe pedestrian conditions, traffic calming treatments should be installed to ensure pedestrian safety.

Pedestrian Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Provide sidewalks and appropriate pedestrian amenities in developing neighborhoods.		
A	Require sidewalks on both sides of all streets in new urban developments.	Ongoing	Local governments
B	Adopt and utilize land use ordinances to ensure new developments provide for adequate pedestrian circulation and are integrated with adjacent land uses.	Ongoing	Local governments
C	Connect bordering, developing neighborhoods with sidewalks and shared-use paths.	Ongoing	Local governments
D	Prepare and implement local pedestrian plans.	Ongoing	Local governments

Figure 4-j Pedestrian Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
2	Retrofit regional streets with modern, safe, and accessible pedestrian accommodations.		
A	Prioritize addition of missing sidewalks on arterial and collector streets with higher demand for walking.	Ongoing	Local governments
B	Identify pedestrian needs and gaps as well as safety problems through walking audits and other methods and implement solutions.	Ongoing	Local governments
C	Reduce or eliminate cost share required of property owners to retrofit in sidewalks in existing neighborhoods.	Ongoing	Local governments
D	Prepare and implement ADA transition plans to retrofit existing non-conforming facilities to ADA standards.	Ongoing	Local governments, MPO
E	Identify and install accessible pedestrian signal systems and other ADA accessibility treatments where a need is demonstrated.	Ongoing	Local governments
F	Provide for a pleasant pedestrian experience with wider sidewalks with appropriate separation on high-volume regional roads with pedestrian attractions.	Ongoing	Local governments
3	Improve safety and usability for pedestrians at intersections and crossings.		
A	Evaluate pedestrian improvements at major street crossings and implement as opportunities are available.	Ongoing	Local governments, MPO
B	As intersections are designed and reconstructed, use modern high quality design to improve safety.	Ongoing	Local governments
C	Use pedestrian design tools to improve crossings such as enhanced and colorized marked crosswalks, refuge islands, and rapid flashing beacons. See Pedestrian Facilities Toolbox in Appendix G.	Ongoing	Local governments
D	Identify and prioritize new grade-separated crossings (streets or shared-use paths) of highways and other barriers (See Pedestrian Barriers and Crossings map in Chapter III).	Ongoing	WisDOT, Local Governments
4	Maintain sidewalks and pedestrian facilities for year-round use.		
A	Provide and enforce snow removal policies, particularly around intersections and bus stops.	Ongoing	WisDOT, Local Governments
B	Implement program to identify and repair broken and substandard sidewalks.	Near Term	Local Governments
5	Design new streets and retrofit existing streets to reduce speeding.		
A	Ensure that local street standards do not require unnecessarily wide streets.	Ongoing	Local Governments
B	Retrofit existing overly wide streets to reallocate space for other uses as part of reconstruction.	Ongoing	WisDOT, Dane County, Local Governments
C	Incorporate traffic calming features into new local streets where appropriate.	Ongoing	WisDOT, Dane County, Local Governments
D	Implement traffic management programs to address speeding and cut through traffic problems on existing streets.	Ongoing	WisDOT, Dane County, Local Governments

Figure 4-j Pedestrian Recommendations and Supporting Actions (Continued from previous page)



Transportation Demand Management

Transportation demand management (TDM) aims to reduce vehicle miles traveled and peak period roadway congestion by maximizing the availability and use of alternatives to driving alone. TDM promotes walking, bicycling, public transit, ridesharing, telework, flexible schedules, micro-mobility (e.g., bike share and e-scooters), and shared mobility (e.g., bike share and car share). TDM contributes to quality of life in the Madison region in many ways, including by expanding access to more affordable and equitable modes of transportation; minimizing the environmental impacts of transportation; and reducing demand for future roadway and parking expansions by using existing infrastructure more efficiently.

Regionally, TDM is implemented by aligning land use strategies, transportation infrastructure, programming, and public and private sector investments. The MPO integrates TDM into its plans, policies and programs, and works with local communities and other partners to advance TDM strategies. TDM is one of two goals in the MPO congestion management process (CMP), supported by performance measures and targets that include reducing vehicle miles traveled per capita, increasing transit ridership, and expanding the low-stress bicycle route network. The MPO also administers RoundTrip, a TDM program that

provides ride-matching services and uses information, encouragement, and incentives to raise awareness and promote the use of alternatives to driving alone among individuals and employers.

The TDM recommendations and supporting actions in Figure 4-k focus on advancing TDM relative to planning and programming; ridesharing and shared mobility; incentives, marketing, and encouragement; and public and private sector partnerships. For additional recommendations related to public transit, bicycling, pedestrians, and parking, see those sections in this chapter.

DEVELOP A STRATEGIC PLAN FOR THE MPO TDM PROGRAM AND INCREASE CAPACITY FOR REGIONAL TDM PLANNING AND PROGRAMMING

The MPO's RoundTrip program provides an established foundation for expanding TDM efforts in the Madison region. RoundTrip works with partners including WisDOT, Dane County, Metro Transit, UW-Madison, and others to fund and promote services, including an online ride-matching platform; emergency ride home program; annual TDM marketing campaign; and resources for employers and agencies interested in encouraging alternatives to driving alone.

As the region grows, RoundTrip must also grow to incorporate new best practices, meet increasing demand, and address changing needs and opportunities. A strategic plan for the program will engage partners in

establishing a shared vision and evaluating priorities for the future. Growth in budget and staffing capacity will expand opportunities for partnerships and services, including assistance for local communities in pursuing TDM project funding. Over the long term, a TDM plan for the Madison region as a whole can bring communities together to establish shared TDM goals; align plans, policies, and programs; and define roles and opportunities.

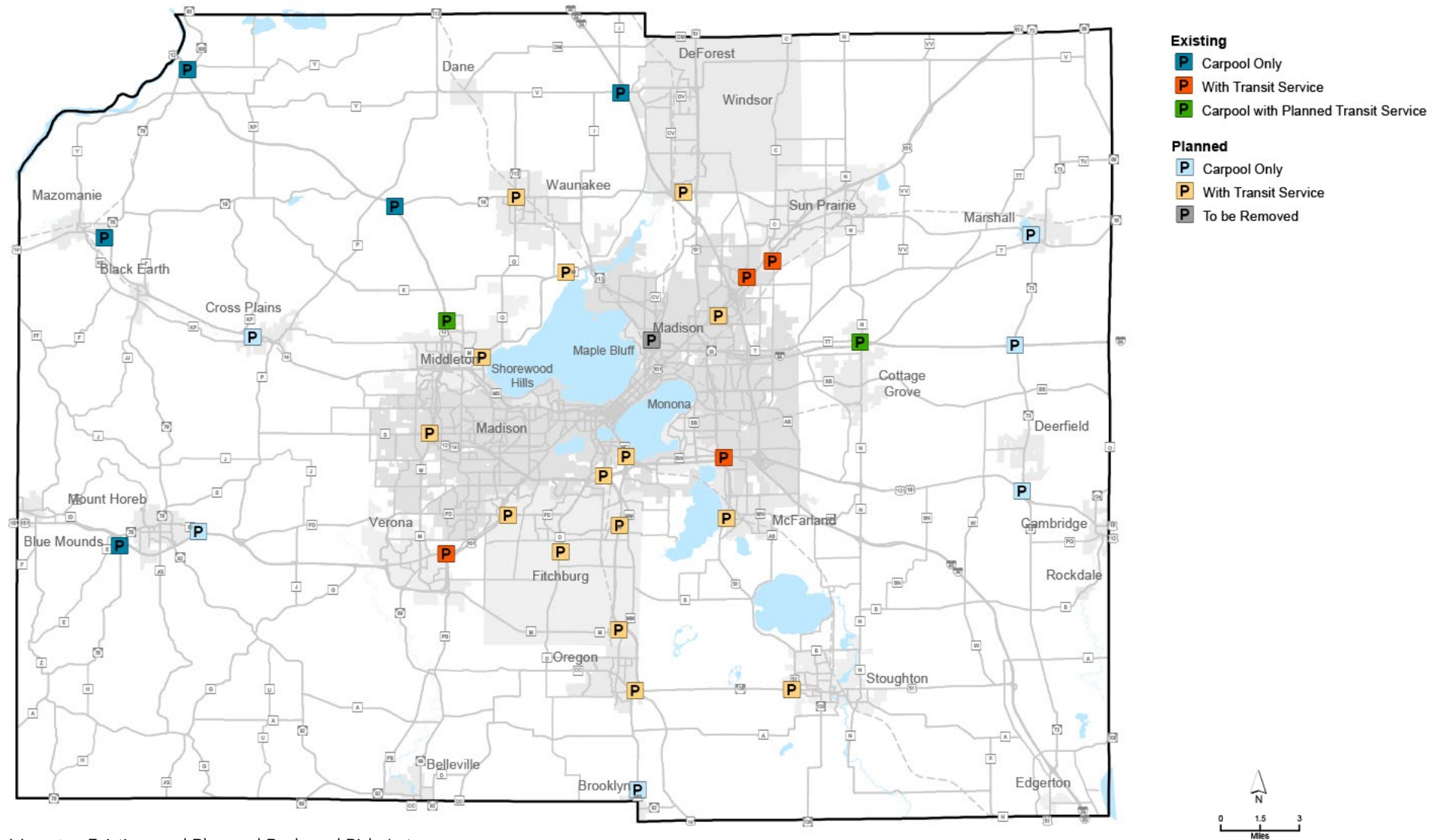
EXPAND THE AVAILABILITY AND USE OF FACILITIES AND SERVICES THAT SUPPORT SHARED MOBILITY IN THE MADISON REGION

For long-distance commuters, facilities and services such as park and ride lots or facilities and vanpools offer options for trips that cannot be fully served by transit or bicycle infrastructure. Park and ride usage in Dane County should be expanded by offering more lots connected to the bikeway network and served by transit, preferably with limited-stop service. This will require the cooperation of multiple agencies to ensure that lots or facilities are easily accessible and meet the needs of different commuters.

Map 4-n shows existing and planned park and ride lots in Dane County, including two existing lots with planned future transit service, and fifteen new planned lots with transit service. One existing lot with transit service is planned for removal with the implementation of bus rapid transit (see Transit recommendation). Park-and-ride lot locations are in most cases general.

Existing and Planned Park and Ride Lots

Dane County, Wisconsin



Partnering with private property owners to make use of under-utilized parking (e.g., at a shopping center) through a lease or other agreement is generally preferable and more cost efficient than building a new lot.

Vanpool options within the region should also be expanded beyond the Wisconsin Department of Administration (WisDOA) vanpool program in order to serve more non-state workers, provide service at different times and expand access to worksites beyond downtown Madison and the UW-Madison campus.

If an additional regional vanpool program is developed, an appropriate managing

agency and sustainable funding must be identified. WisDOT would be a logical agency to run a statewide program, potentially in partnership with MPOs. Employer-based vanpool programs may also be developed by one or more employers working together to serve specific locations.

Shared mobility services such as bike share and car share provide affordable, flexible options that encourage use of the larger multimodal network. Demand for shared micromobility, including bike share and emerging options such as dockless scooters and e-skateboards, is growing rapidly and will require ongoing attention by local

governments. Convenient car share systems that reduce demand for personal vehicle ownership and drive-alone commutes should be supported. In order to making these and other modes as easy and convenient as possible, agencies should improve and invest in technologies such as the statewide ridematching platform and mobility as a service (MaaS) platforms.

WORK WITH MUNICIPALITIES, EMPLOYERS, AND INSTITUTIONS TO IMPLEMENT AND PROMOTE STRATEGIES TO REDUCE DRIVE-ALONE VEHICLE TRIPS

TDM is most successful in locations where legal requirements drive investments at the property level, and public-private partnerships provide supportive resources, programs, and services. To jumpstart investments in infrastructure and programming by employers and property owners, municipalities should integrate TDM requirements as a condition of approval for large developments, including specific measures, flexible implementation options, and processes for reporting and monitoring.

As demand for TDM grows, Transportation Management Associations (TMAs) are a powerful tool that can support coordinated, efficient implementation of TDM strategies within employment centers and other defined geographies in the Madison area. TMAs are typically non-profits that pool member resources and rely on strong public-private partnerships, but vary widely in size, organization, and membership. TMAs provide



services such as marketing, incentives, programming, advocacy, and administration. The RoundTrip program, which is available to assist employers and property managers with site-based TDM strategies, is an important regional partner and resource. In addition to promoting walking, bicycling, public transit and ridesharing, the rise in telework and flexible schedules during the coronavirus pandemic has provided a unique opportunity to encourage these options to reduce drive-alone commute trips, congestion, and on-site parking demand.

EXPAND THE AVAILABILITY, USE, FUNDING, AND MARKETING OF FINANCIAL INCENTIVES AND ENCOURAGEMENT PROGRAMS

Financial incentives are among the most effective TDM strategies, particularly when implemented with a “carrot and stick” approach that dis-incentivizes driving alone while increasing the appeal of other modes. To promote this approach, it is critical to expand employer adoption of programs and strategies such as the Metro Commute Card, parking cash-out, occasional parking, and commuter challenges. Celebrating employers through recognition programs will expand awareness and build a culture of excellence around workplace-based TDM. Increasing funding for marketing, encouragement programs, and support services such as emergency ride home will contribute additional momentum, and expand opportunities for individualized behavior



change programs such as SmartTrips trip planning and Love to Ride bicycle challenges.

SUPPORT TRANSPORTATION OPTIONS AT SCHOOLS THROUGH INFRASTRUCTURE AND PROGRAMMING

Vehicle congestion around schools is an issue affecting traffic flow, air quality, and safety, particularly for bicyclists and pedestrians. Safe Routes to School (SRTS) programs are an effective way to encourage families to walk and bike to school; promote safe multimodal access; and increase physical activity among children. Since the inception of the federal SRTS program, many

communities in the Madison region have undertaken SRTS projects, but sustainable funding is necessary to ensure their continuity and expansion. A countywide program that focuses on schools in areas most at-risk for adverse health, safety, and environmental outcomes, is currently funded by the MPO through 2026 under the federal Transportation Alternatives program.

Transportation Demand Management Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Develop a strategic plan for the MPO TDM program and increase capacity for regional TDM planning and programming.		
A	Develop a time-bound strategic plan for the MPO TDM program that integrates equity and aligns strategies with best practices in behavior change.	Near Term	MPO
B	Establish a dedicated budget for the TDM program beyond staffing costs, in order to expand capacity for marketing, programming, and partnerships.	Near Term	MPO
C	Educate eligible entities about the availability of STBG-Urban funding for TDM programs and services, and assist in the development of local projects.	Ongoing	MPO, Local Governments
D	Work with local communities, Dane County, WisDOT, and public and private sector stakeholders to develop a TDM plan for the Madison region.	Long Term	MPO, WisDOT, Dane County, Local Governments
2	Expand the availability and use of facilities and services that support shared mobility.		
A	Develop partnerships to expand the regional network of park and ride lots and increase the number of lots with multimodal access and infrastructure such as secure bicycle parking.	Ongoing	WisDOT, Dane County, Local Governments, Metro
B	Expand vanpool options by growing the WisDOA vanpool program and supporting the development of additional vanpool programs, both regional and employer-based.	Near-Mid Term	WisDOA, WisDOT, MPO, Local Governments, Transportation Providers
C	Expand the use and availability of bike share and car share systems.	Ongoing	WisDOT, MPO, Local Governments, Transportation Providers
D	Evaluate and plan for emerging shared micromobility options.	Ongoing	MPO, Local Governments
E	Expand the use and availability of TDM-supportive technology, including ridesharing platforms and mobility as a service (MaaS).	Ongoing	WisDOT, MPO, Local Governments, Transportation Providers

Figure 4-k Transportation Demand Management Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Work with municipalities, employers, and institutions to implement and promote strategies to reduce drive-alone vehicle trips.		
A	Encourage and assist local communities to adopt policies requiring the preparation and implementation of TDM plans based on specific standards and criteria as a condition of approval for large developments.	Near Term	MPO, Local Governments
B	Support the development of transportation management associations (TMAs) to facilitate coordinated, efficient TDM activities in major employment centers.	Mid Term	MPO, Local Governments, Non-Profits
C	Encourage and assist employers interested in developing or expanding commuter benefits programs that promote alternatives to driving alone.	Ongoing	MPO, Non-Profits, Local Governments, Employers
4	Expand the availability, use, funding, and marketing of financial incentives and encouragement programs.		
A	Expand employer use of financial incentive programs that reduce drive-alone trips, such as the Metro Commute Card, parking cash-out, occasional parking, and workplace commuter challenges.	Ongoing	MPO, Metro, Local Governments
B	Expand employer participation in programs that celebrate commute options leaders, including Dane County Climate Champions and Best Workplaces for Commuters.	Ongoing	MPO, Dane County, Local Governments
C	Increase funding for regional TDM marketing activities to expand existing strategies and support new approaches such as "SmartTrips."	Near Term	MPO, Dane County, WisDOT, Metro, UW
D	Increase funding for support services such as Emergency Ride Home, and encouragement programs such as Love to Ride and local commuter challenges.	Near Term	WisDOT, MPO, Dane County, Local Governments
E	Increase awareness and use of local TDM programs and resources among minority and traditionally underserved communities, including non-driving adults.	Ongoing	MPO, Local Governments, Non-Profits
5	Support transportation options at schools through infrastructure and programming.		
A	Secure sustainable funding for a regional Safe Routes to School program utilizing resources such as mini-grants, CIP funding, local operating budget funding, private funding, or federal funding.	Near Term	MPO, Non-Profits, School Districts, Local Governments
B	Work with schools to encourage alternatives to driving alone among students, parents, staff, and teachers for trips including and beyond the school commute.	Mid Term	MPO, Non-Profits, School Districts, Local Governments

Figure 4-k Transportation Demand Management Recommendations and Supporting Actions (Continued from previous page)

P Parking

When appropriately priced and designed, parking contributes to the vitality of urban areas by supporting economic activity in retail and entertainment districts and facilitating access to employment centers. When parking is underpriced and scaled to accommodate the highest peak demand, however, it can lead to inefficient, sprawling land use that increases the appeal of driving and decreases the appeal of walking, bicycling, public transit, and ridesharing. Discouraging these other modes, which are more affordable and efficient than personal vehicles, leads in turn to increased

vehicle miles traveled and congestion in communities, and negative impacts to public health, safety, quality of life, and the environment. See Figure 4-I for Parking Recommendations and Supporting Actions.

USE PARKING MANAGEMENT STRATEGIES TO REDUCE CONGESTION AND PARKING DEMAND, AND MODIFY PARKING REQUIREMENTS FOR NEW DEVELOPMENT

Strategic parking management encourages multi-modalism and ensures the vibrancy of communities through effective pricing and efficient land use. Today, more public and private entities are taking steps to

right-size their parking facilities and better manage existing supply. These steps include relaxing or eliminating minimum parking requirements, implementing software-based Smart Parking systems, and utilizing dynamic pricing and commuter incentives to moderate demand. Infrastructure and policies that reduce excessive parking and encourage other modes of travel are particularly important to ensure walkable, human-scaled environments in downtowns and other mixed-use activity centers.

ENSURE THE FLEXIBILITY OF ON- AND OFF-STREET PARKING FACILITIES TO ACCOMMODATE CHANGING DEMAND

Flexible approaches to parking management and design are also important in light of rapidly changing technology, mobility services, and social norms that may reduce future demand. These factors include emerging technologies such as autonomous vehicles and mobility-as-a-service (MaaS) platforms; expansions in access to ridesharing, micromobility, and shared mobility services; and changes initiated by the coronavirus pandemic, including new norms around telework and flexible schedules, and new programs allowing outdoor dining, takeout pickup, and bicycle parking in on-street parking spaces. To ensure flexibility, new parking design should support conversion to other uses as demand changes, and owners should evaluate existing facilities for new or additional uses when reaching the end of their viability.



Parking Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Use parking management strategies to reduce congestion and parking demand, particularly in major activity centers.		
A	Encourage ridesharing by implementing policies that provide reduced rates and/or preferential parking spots to carpools and vanpools.	Near Term, Ongoing	Local governments, private owners
B	Encourage multimodal commutes by eliminating long-term parking payment options such as monthly and annual permits, which promote daily driving.	Near Term	Local governments, private owners
C	Implement technologies and associated policies such as demand responsive pricing that efficiently manage existing infrastructure, and reduce pollution and safety risks due to vehicle idling and circling.	Near Term, Ongoing	Local governments
D	Develop downtown parking management plans and consider eliminating free long-term parking in downtowns.	Mid Term	City of Madison
E	Discourage employer-subsidized parking, or if parking is subsidized, encourage employers to provide a financial incentive of at least equivalent value to employees who forgo single-occupancy parking, such as parking cash-out or multimodal benefits.	Near Term, Ongoing	MPO, local governments, private owners
2	Modify parking requirements for new development to encourage multi-modalism and innovative design, while addressing potential spillover impacts.		
A	Consider eliminating minimum parking requirements to ensure an appropriate balance between parking needs, other transportation options, and continuity of the built environment.	Near Term	Local governments
B	Allow deviation from parking minimums, particularly in dense urban areas with good transit service, to accommodate innovative project designs that maximize access to alternative modes and incorporate TDM strategies.	Near Term, Ongoing	Local governments
C	Encourage unbundled parking in new residential and commercial developments, priced at market rate, to distribute the cost of parking equitably.	Near Term, Ongoing	Local governments
D	Conduct a regional study on parking to assist communities in adequately pricing and right-sizing parking requirements and facilities.	Near Term	MPO, local governments
3	Ensure the flexibility of on- and off-street parking facilities to accommodate changing demand.		
A	Design streets with flexibility in mind and ensure that parking policies allow for the conversion of street parking to other uses such as dining, loading, or micromobility as needs change and new technologies are implemented.	Near Term, Ongoing	Local governments
B	Design new parking structures to accommodate conversion to other uses as parking priorities change due to emerging technologies, changing travel habits, and other market factors.	Ongoing	Local governments

Figure 4-I Parking Recommendations and Supporting Actions



Inter-Regional Travel

In an increasingly connected world, inter-regional travel opportunities must be maintained and expanded. While intercity-bus options are currently available, buses lack a common terminus and often lack good connections to local bus routes. Further, inter-city passenger rail service is unavailable locally, requiring a drive of approximately 40 minutes from downtown Madison to reach the nearest Amtrak station in Columbus or a longer bus ride to Milwaukee or Chicago. The needs and recommendations in Figure 4-m include strategies and investments that preserve and enhance intercity bus services and add passenger rail service.²⁹ See Figure 4-m for Inter-Regional Travel Recommendations and Supporting Actions.

CONSTRUCT AN INTER-CITY TRANSIT HUB

The lack of a centralized inter-city bus terminal is the most immediate need for improving inter-regional travel by bus. A new facility needs to be centrally located with convenient access to the University of Wisconsin campus as well as downtown Madison. A modern, attractive facility would feature ticket sales and other needs and amenities for passengers. Several examples of well-located and designed terminals can be found in nearby and peer cities such as Milwaukee (Milwaukee Intermodal Station), Saint Paul (Saint Paul Union Depot), La Crosse, Grand Rapids, and Champaign-Urbana.

²⁹ As required at 23 CFR 450.324(f)(8)



While a new inter-city bus terminal would initially only serve buses, consideration needs to be given to future rail service to ensure convenient integration with existing and future services. Inter-city bus operators should be able to reliably access the new terminal without regular interference from traffic and other delays; however, future passenger rail connecting Madison to the Twin Cities is highly unlikely to serve downtown Madison or the UW- Madison campus directly. It is possible commuter rail service from Chicago could be extended to downtown Madison. Given the difficulty in finding a location for a station it is most important the bus terminal be centrally located with convenient connections to local

transit service. A facility has been proposed to be located at the Lake Street parking garage, to be built in conjunction with reconstruction of the garage and housing development above. This would be a great location from a customer and transit service accessibility standpoint.

SUPPORT IMPROVED INTER-CITY TRANSIT

Madison is well-served by inter-city bus service, still, several gaps remain. Demand for travel to the Twin Cities will likely support far more service than is currently provided by the several daily round trips provided by Megabus, Greyhound, Jefferson Lines, and

FlixBus. More frequent buses, particularly on the express routes, would make the bus an attractive alternative to driving. Increased frequency to northeastern Wisconsin is also needed. Only one daily round trip is available between Madison and Fond du Lac, Oshkosh, Appleton, and Green Bay. The population served by this route would be better served by several daily round trips. Additionally, bus services to Iowa (Dubuque, Davenport, Des Moines, etc), Omaha, St Louis, and Kansas City are inconvenient. Improved service could consist of new, longer routes with direct service to these cities, increased frequency, and better connections.

Until passenger rail service is available in Madison, increased access to Amtrak must be provided by increasing the frequency of inter-city service and connectivity to Amtrak stations. Thruway bus service, a coordinated joint ticketing service connecting to Amtrak, currently provides connections to rail service from Madison with a route to Columbus and a connection at Chicago's Union Station. Connections to south and east coast trains in Chicago are convenient with frequent service to Chicago Union Station, but connections to west coast trains like the Empire Builder, California Zephyr, and Southwest Chief require out-of-direction travel or long waits. Badger Bus also provides non-Thruway service to the Milwaukee Intermodal Station, which is served by Amtrak's Empire Builder and Hiawatha services and planned Twin Cities - Milwaukee - Chicago (TCMC) Regional Rail service (2024).

IMPLEMENT INTER-CITY PASSENGER RAIL SERVICE

Prior to 2010, an expansion of the popular Amtrak Hiawatha Service was planned to downtown Madison. The service, which was planned as high-speed by US standards, would have had seven trains per day departing Madison, arriving in Chicago with stops in Milwaukee and other cities in between. This project was awarded federal stimulus funds, however, the funds were returned by the state prior to construction.

Planning for inter-city passenger rail service should be resumed as a priority. The IIJA provides for unprecedented levels of

federal funding for passenger rail projects nationwide, including \$41 billion for Amtrak and \$43.5 billion for intercity passenger rail. In addition to Amtrak service connecting to Minneapolis / St Paul and Milwaukee, extension of Metra or similar service directly to Chicago should be evaluated and pursued if feasible. Planning, environmental review, design, and construction should be pursued aggressively while these funds are available. When rail improvements are needed along previously identified corridors, considerations should be made for the types of improvements that will be compatible with passenger service.



Inter-Regional Travel Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Initiate planning for and build an inter-city bus terminal.		
A	Construct a new high-quality inter-city bus terminal in central Madison that has convenient access to downtown Madison and the UW-Madison campus.	Mid-Long Term	City of Madison
B	Ensure that inter-city bus passengers can conveniently transfer to BRT and local buses.	Mid-Long Term	City of Madison, Metro
2	Support new and improved inter-city bus service.		
A	Improve service frequency to Minneapolis / St Paul and Appleton / Green Bay.	Near-Term	WisDOT, Private Providers
B	Improve connections to Amtrak services like the Empire Builder.	Near-Term	WisDOT, Private Providers
C	Provide direct service to Davenport, Des Moines, Omaha, and other cities to the west.	Near-Term	WisDOT, Private Providers
3	Maintain and preserve the rail network and plan for future passenger rail service.		
A	Identify inter-city passenger rail routes to Milwaukee, Chicago, and Minneapolis / St Paul.	Near-Term	WisDOT, MIPRC, Amtrak
B	Identify station location(s) for passenger rail service.	Near-Term	WisDOT, City of Madison, Amtrak
C	In cooperation and in coordination with WisDOT, acquire, maintain, and preserve rail corridors to ensure practical viability of future rail services.	Near-Term	WisDOT, railroad companies
4	Implement passenger rail service to and through the Madison area.		
A	Implement direct Amtrak passenger rail service to the Madison area connecting to Milwaukee, Chicago, Minneapolis / St Paul, and the national rail system.	Mid-Long Term	WisDOT, MPO, City of Madison, FRA, MIPRC, Amtrak
B	Support Madison's inclusion in the Twin Cities - Milwaukee - Chicago (TCMC) Regional Rail service.	Near-Term	WisDOT, Amtrak
C	Implement rail service connecting the Madison area to Chicago.	Mid-Long Term	WisDOT, SLATS, MPO, Others
D	Support the implementation of WisDOT's rail plan, which includes passenger, freight, and crossing safety considerations.	Ongoing	MPO, local governments, railroad companies

Figure 4-m Inter-Regional Travel Recommendations and Supporting Actions



Freight, Air, and Rail

While manufacturing is a relatively small percentage of Dane County's economy compared to others in the state, the efficient movement of freight into, out of, and through the county is still an important to the regional economy. Freight, air, and rail access improve the financial condition of area residents as well as businesses, given the increasing role online shopping and home deliveries. Policies related to these modes should enhance the financial interests of all in the region. See Figure 4-n for Freight, Air, and Rail Recommendations and Supporting Actions.

INCREASE THE LOCAL FOCUS ON FREIGHT PLANNING

Freight-focused planning efforts should be incorporated into local planning efforts to ensure promotion and preservation of freight uses along freight corridors and targeted expansion of freight-related infrastructure.

MITIGATE RAIL CONFLICTS WHILE MAINTAINING THE VIABILITY OF RAIL SERVICE

Safety concerns at rail crossings should be studied and remedied with the help of private rail operators. Land use conflicts, such as rail crossings in residential areas, should be mitigated through the use of improvements that allow designation of "quiet zones." Rail corridors should be acquired when abandoned to preserve the

corridors for future freight and passenger rail service and other transportation uses. When improvements to rail infrastructure are needed, governmental agencies should work with private operators to accommodate heavier loads at higher speeds.

ENSURE COMPATIBILITY OF LAND USE PLANNING NEAR AIRPORTS

The area in which an airport operates can have a number of negative externalities such as increased noise, light, and air pollution. Care should be taken to ensure compatibility of land uses by accounting for existing and future airport master plans in development of local comprehensive plans. Further, the airport master plan should account for future land use plans encapsulated in local comprehensive plans.

Freight, Air, and Rail Recommendations and Supporting Actions

Recommendations and Supporting Actions		Timeframe	Implementing Party
1	Maintain and promote new industrial uses along freight corridors.		
A	Work with stakeholders to determine significant transportation issues that negatively impact freight generating or receiving businesses within the region.	Ongoing	MPO, WisDOT
B	Work to cluster like industrial uses to promote efficiency of the freight network.	Ongoing	Local governments
2	Maintain and expand existing infrastructure on the multimodal freight network, prioritizing projects that improve safety, increase efficiency, and minimize lifetime costs.		
A	Investigate and implement vehicle-to-infrastructure technologies to increase safety and reduce delay in freight corridors.	Medium Term	WisDOT, Dane County, Local governments
B	Consider how new technologies may impact the demand for future transportation facilities when planning improvements to the network.	Ongoing	WisDOT, Dane County, Local governments
C	Continue enforcement of truck weight regulations to reduce premature deterioration of roadways and bridges.	Ongoing	WisDOT

Figure 4-n Freight, Air, and Rail Recommendations and Supporting Actions (Continued on next page)

Recommendations and Supporting Actions		Timeframe	Implementing Party
3	Increase focus on freight planning for regional and local transportation facilities.		
A	Continue to incorporate freight considerations into corridor and planning studies.	Ongoing	WisDOT, Dane County, Local governments
B	Implement the Wisconsin State Freight Plan, planning for or implementing recommendations coming from the plan.	Ongoing	WisDOT, Local governments
C	Ensure local and regional freight-centric projects are listed in Wisconsin State Freight Plan to maintain eligibility for enhanced federal funding match.	Ongoing	WisDOT, Dane County, MPO, Local governments
D	Consider first and last mile(s) implications for freight when approving site plans for freight generating or receiving facilities.	Ongoing	Local governments
4	Maintain the availability of rail facilities for current and future uses.		
A	Preserve rail corridors for freight uses, acquiring excess land when available to ensure availability for future transportation services.	Ongoing	WisDOT
B	Plan for improvements to accommodate future high speed, high volume passenger service on routes to Milwaukee, Chicago, and St Paul, such as positive train control, double tracking, and electrification.	Long Term	WisDOT
5	Mitigate conflicts between rail and other uses.		
A	Identify high-conflict rail crossings and mitigate conflicts, when possible.	Ongoing	WisDOT, Dane County, Local Governments
B	Continue to implement quiet zones in residential neighborhoods within urbanized areas.	Ongoing	Local Governments
C	Work with rail companies to grade-separate future high-use rail crossings where feasible, such as Stoughton Road crossing.	Ongoing	WisDOT, Dane County, Local Governments
6	Ensure compatibility of uses near airports.		
A	Ensure land use plans within airport influence areas are compatible with existing and planned airport plans.	Ongoing	Local Governments
B	Ensure Airport Master Plans consider existing and future uses identified in community comprehensive plans.	Ongoing	Dane County
C	Continue to implement the Airport Master Plan.	Ongoing	Dane County
7	Improve multi-modal access to airports.		
A	Improve multi-modal access to airports.	Ongoing	Dane County, Local governments, Metro

Figure 4-n Freight, Air, and Rail Recommendations and Supporting Actions (Continued from previous page)

Evaluating Plan Progress

The Infrastructure Investment and Jobs Act (IIJA) requires MPOs to develop a system performance report, and monitor and evaluate federally required performance targets as part of integrating a performance-based planning approach into the development and implementation of the RTP. The System Performance Report can be found in Appendix B. Beyond the

federally required measures, the MPO has developed supplemental measures to measure and evaluate regional priorities. It is anticipated that the list of performance measures will evolve over time as new data and measurement techniques become available. The current federal and regional measures are listed in Figure 4-o and 4-p. The tracking, evaluation, and reporting of these performance measures and targets will be used to gauge progress in achieving the national and regional goals, help to further inform decisions about investments and strategies, and will describe how well the

regional transportation system is performing over time.

The MPO began producing an annual performance measures report in 2015 to track regional performance, including the federally required performance measure in accordance with federal guidelines. The development of the annual performance measures report was temporarily halted in 2020 due to the significant impacts of Covid-19. The MPO will resume tracking performance measures in 2022 in an interactive online format.

Federal Transportation Performance Measures

Performance Measure Area	Performance Measures
PM 1 - Safety	
Number of Fatalities and Serious Injuries	Number of Fatalities
	Number of Serious Injuries
	Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries
Rate of Fatalities and Serious Injuries	Rate of Fatalities per 100 Million Vehicle Miles Travelled (MVMT)
	Rate of Serious Injuries per 100 Million Vehicle Miles Travelled (MVMT)
PM 2 - Infrastructure Condition	
Condition of Pavements on the Interstate System	Percentage of Pavement of the Interstate System in Good Condition
	Percentage of Pavement on the Interstate System in Poor Condition
Condition of Pavements on the National Highway System (NHS) Excluding the Interstate	Percentage of Pavement of the Non-Interstate NHS System in Good Condition
	Percentage of Pavement of the Non-Interstate NHS System in Poor Condition
Condition of Bridges on the NHS	Percentage of NHS Bridges Classified as in Good Condition
	Percentage of NHS Bridges Classified as in Poor Condition

Figure 4-o Federal Transportation Performance Measures (Continued on next page)

Performance Measure Area	Performance Measures
PM 3 – System Reliability	
Performance of the Interstate System	Percentage of the Person-Miles Traveled on the Interstate that are Reliable
Performance of the NHS Excluding the Interstate	Percentage of the Person-Miles Traveled on the Non-Interstate NHS that are Reliable
Freight Movement on the Interstate System	Truck Travel Time Reliability Index
Transit Asset Management (TAM)	
Transit Asset Management	Percentage of Revenue Vehicles Exceeding Useful Life
	Percentage of Non-Revenue Service Vehicles Exceeding Useful Life
	Percentage of Facilities Exceeding the Transit Economic Requirements Model (TERM) Scale
	Percentage of Track Segments Having Performance Restrictions
Public Transit Safety Program (PTSP)	
Public Transportation Safety Program	Number of Reportable Fatalities
	Rate of Reportable Fatalities Per Vehicle Revenue Miles
	Number of Reportable Injuries
	Rate of Reportable Injuries per Vehicle Revenue Miles
	Number of Reportable Safety Events
	Rate of Reportable Safety Events Per Vehicle Revenue Miles
	Mean Distance Between Major Mechanical Failures

Figure 4-o Federal Transportation Performance Measures (Continued from previous page)

Supplemental RTP Performance Measures

Performance Measures	
New development built in centers and along transportation corridors*	Transit On-Time Performance
New development built in already-developed areas*	Frequent Transit Service Network Job and Household Access
BCycle Utilization & Service Area	Buses at or Past Replacement Age
Regional Low-Stress Bike Network	Job Access by Mode
Mode of Transportation to Work	Vehicle Miles Traveled
Transit Ridership	Vehicle Hours of Delay

*Regional Development Framework (RDF) Measures

Figure 4-p Supplemental RTP Performance Measures



Chapter 5:

Funding the Plan: Financial Capacity Analysis

Funding the Plan: Financial Capacity Analysis

Introduction

Federal transportation planning rules require that regional transportation plans include a financial capacity analysis to demonstrate that the plan is fiscally constrained. That is, it must be demonstrated that the estimated costs of recommended capital projects in the federally recognized, fiscally constrained plan and maintenance of the transportation system can be covered using available and projected revenue sources. If projected funding shortfalls exist, new sources of revenue must be identified. While projecting revenue and project costs out for such a long period is very difficult, the purpose of the analysis is to ensure the plan doesn't just include a wish list of projects. Rather, potential projects need to be prioritized, realistically assessing the ability to fund them, and balancing the needs of new facilities or capacity expansion projects with system preservation needs.

The plan may identify recommended or needed projects, but if it cannot be demonstrated that funding is reasonably likely to be available for the projects or the scope and cost of projects is uncertain, they cannot be included in the federally recognized plan. For example, later phases of the planned

Bus Rapid Transit (BRT) system are not part of the fiscally constrained plan. The currently budgeted East-West Route and the planned North/South route are included. The major state highway projects that will come out of the current Beltline and Stoughton Road studies are also not included due to the uncertain scope and cost of those projects. The same is true of project(s) to come out of the Interstate study, although as an inter-city project it would not need to be part of the MPO's fiscally constrained plan.

The financial capacity analysis takes into account recent trends in sources and uses of funds and currently programmed projects,

and estimates the ability of anticipated funding sources to meet the maintenance, preservation, and capacity expansion needs of the transportation system. Average annual program funding amounts were estimated based on recent trends. The analysis also accounts for the large increase in federal transportation formula program funding in federal fiscal years (FFY) 2022-2026 under the recently passed Infrastructure Investment & Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL).

The IIJA included the reauthorization of the federal surface transportation legislation. The law maintains the same basic formula



funding programs, but also includes some new formula and discretionary grant programs that allow states, MPOs, and local governments to apply directly to USDOT for funding. The Federal Highway Administration (FHWA) recently released the state and MPO federal formula program allocations for FFY 2022. For the two existing programs for which the MPO receives a suballocation of funding – Surface Transportation Block Grant (STBG) Urban and Transportation Alternatives Program (TAP) – those FFY 2022 amounts were assumed as average annual funding moving forward. For the two programs allocated to states – National Highway Performance Program (NHPP) and Highway Safety Improvement Program (HSIP) – the same percentage increase in program funding for Wisconsin was assumed for the Madison Metropolitan Area. A 2.0% annual inflationary increase in these funding amounts was assumed into the future. No additional funding was assumed from the new discretionary program funding.

The IJA provides the federal transportation funding program and planning framework for the next five years. While the IJA and other recent transportation bills have made some changes in programs, the current basic formula program framework has been in place since 1991 when the landmark ISTEA legislation was passed. Therefore, it is safe to assume that this basic framework will continue. As noted, IJA added numerous discretionary grant programs. While it is safe to assume at least some of those will continue

in the future and the greater Madison region will be able to secure some of those funds, this hasn't been factored into the analysis. While short-term funding methods using general revenue were employed to provide the necessary funding for the IJA, it is assumed that a long-term solution will be developed to maintain those funding levels with the assumed inflationary increases.

The financial capacity analysis assumes that state funding will increase around 2% annually. This has not been the trend for highway construction funding. From 2006 – the last year the state gas tax was increased – to 2021 highway construction funding (including state highways and local road and bridge assistance) actually decreased 15% or an average of 1% per year in constant dollars. In contrast, highway operations (maintenance) funding increased 32% or 2.1% per year. Transit aids decreased almost 24% or 1.6% per year.¹ This plan assumes that in the long term, the state transportation funding situation will be addressed and that inflationary increases to recent spending levels in the Metropolitan Planning Area will be provided.

In the long run, additional or alternative transportation funding source(s) to the gas tax will be needed at both the state and federal levels with the electrification of the fleet. The most logical is some sort of road

user charge. While the future source(s) of revenue is uncertain, an assumed continuation of current federal funding levels under the IJA and recent state funding levels with future inflationary increases to both is reasonable.

Estimated project costs must be in year-of-expenditure dollars, reflecting an assumed inflationary factor. An inflationary factor of 1.74% was used for project costs. As noted, a 2.0% inflationary factor was used for program funding in accordance with WisDOT and USDOT guidance.

¹ Transportation Budget Trends: 2000–2021, WisDOT Bureau of Budget (<https://wisconsindot.gov/Documents/about-wisdot/performance/budget/TransportationBudgetTrends2020-21.pdf>).



Funding Trends in the Metropolitan Planning Area

COUNTY AND MUNICIPAL STREETS/ROADWAYS

Municipal streets are mostly financed by local funding sources. These include general revenues (mostly from the property tax) and bonds and, in the case of municipalities, also special assessments, impact fees, and tax increment financing. Counties cost share with municipalities on some projects. WisDOT distributes state funding to counties and municipalities through the state's General Transportation Aids and Connecting Highway Aids programs, and through other local programs such as the Local Road Improvement Program.

Figure 5-a, Historical County and Local Street/Roadway Expenses, shows the expenditures for operations and maintenance, construction, and other street related facilities (e.g., lighting, sidewalks, storm sewers) by municipalities in the Metropolitan Planning Area from 2015 to 2019, the last year for which data was available.² The expenses include those from local revenues as well as state and federal programs. Total annual costs for Dane County and all municipalities within the Metropolitan Planning Area increased significantly over this 5-year period from \$117.9 million in 2015 to \$181.4 million in 2019 with the largest increases in 2018-'19. This was due in part

to sharp increases in the cost of roadway construction materials. The annual average over the 5-year period was \$149.5 million. This includes an average of \$88.1 million for construction and \$61.4 million for operations and maintenance.

FEDERAL AND STATE FUNDING FOR STREETS/ROADWAYS

Federal and state funding accounts for 25.5% and 64.7% of revenues, respectively, in the WisDOT 2021-'23 biennial budget with bond funds (3.6%) and other funds (3.5%) accounting for the remainder. Federal funding is derived primarily from the federal motor fuel tax and then allocated to the states and large urban areas. Federal program funding sources under the current surface transportation legislation, the IIJA, that are used for roadway improvements include the following:

- National Highway Performance Program (NHPP);
- Surface Transportation Program Block Grant (STBG) Program (formerly Surface Transportation Program) – includes three categories of funding (Urban, Rural/Small Urban, and State Flexibility); and
- Highway Safety Improvement Program (HSIP) – also includes three categories.

The NHPP and STBG – State Flexibility programs have been used exclusively for state highway projects, while the HSIP program is available for funding both state and local projects. The STBG – Urban

and Rural/Small Urban programs are for county and local roadway projects. For the Metropolitan Planning Area, the STBG Urban Program is the most significant of these federal programs for local projects. Most of the funding has been used for county and local road projects, but the program has also been used for other capital projects such Metro Transit bus purchases and an ITS project. A bicycle/pedestrian project was approved in the last application cycle. The MPO also funds its Transportation Demand Management (TDM) program primarily with this funding.

The Greater Madison MPO receives an allocation of STBG – Urban Program funding and selects county and local projects for funding based on approved policies and project evaluation criteria. The MPO's annual allocation had been \$6.86 million in the recent past, but will increase to \$8.99 million in FFY 2022 under the IIJA. A further small increase is expected in FFY 2023 and beyond once 2020 Census urban area population data is factored into the funding allocations. That has not been factored into the revenue estimate. The higher STBG – Urban program funding level in FFY 2022 under the IIJA is assumed to continue into the future with inflationary adjustments as with other programs.

State transportation funding is derived primarily from the state motor fuel tax, driver license fees, and vehicle registration fees. Funding for state highways is distributed through several programs, including the following:

² Source: [County and Municipal Revenues and Expenditures by Wisconsin Cities, Villages & Towns](#) reports published by the Wisconsin Department of Revenue.

Historical County and Municipal Street/Roadway Expenses (\$1,000's) within the Madison Metropolitan Planning Area

	2015				2016				2017				2018				2019			
County/ Municipality	O & M ¹	Const. ²	Other ³	Total	O & M ¹	Const. ²	Other ³	Total	O & M ¹	Const. ²	Other ³	Total	O & M ¹	Const. 2	Other ³	Total	O & M ¹	Const. ²	Other ³	Total
Dane County ⁴	8,060.19	5,674.18	1,531.21	15,265.58	8,528.88	5,996.33	932.39	15,457.61	9,422.83	16,249.97	815.55	26,488.36	11,455.30	11,016.93	879.24	23,351.46	9,813.66	17,687.89	357.92	27,859.48
C. Fitchburg	1,734.30	2,616.90	185.30	4,536.50	1,799.30	2,643.40	205.50	4,648.20	1,884.60	4,597.10	218.50	6,700.20	1,917.90	2,723.00	889.70	5,530.60	2,293.20	7,431.30	633.70	10,358.20
C. Madison	25,480.00	16,425.30	6,937.20	48,842.50	23,837.50	16,117.50	6,202.20	46,157.20	24,588.60	27,064.50	6,511.90	58,165.00	25,880.70	35,961.60	8,536.30	70,378.60	29,897.90	35,821.90	10,310.10	76,029.90
C. Middleton	2,122.60	3,015.20	2,027.70	7,165.50	2,545.70	2,364.50	254.10	5,164.30	2,868.10	2,018.50	500.20	5,386.80	3,036.50	3,730.40	225.10	6,992.00	3,311.90	3,234.90	171.50	6,718.30
C. Monona	1,117.80	439.40	129.20	1,686.40	927.60	627.50	91.50	1,646.60	782.70	1,042.90	325.60	2,151.20	843.80	1,177.20	98.30	2,119.30	897.30	4,473.10	102.20	5,472.60
C. Stoughton	1,296.60	1,935.00	233.50	3,465.10	1,278.10	5,091.60	1,159.80	7,529.50	2,823.60	2,208.80	122.40	5,154.80	9,477.90	2,513.40	399.10	12,390.40	2,003.90	2,684.40	1,108.30	5,796.60
C. Sun Prairie	2,681.60	2,374.90	1,174.80	6,231.30	2,316.60	4,171.00	912.30	7,399.90	1,905.70	4,832.00	1,066.50	7,804.20	2,243.30	9,809.50	1,608.00	13,660.80	3,158.40	6,868.10	1,232.30	11,258.80
C. Verona	1,130.30	3,578.70	224.20	4,933.20	2,071.60	1,808.70	212.70	4,093.00	2,430.30	3,086.60	271.10	5,788.00	1,473.10	7,500.10	169.70	9,142.90	4,179.90	6,191.30	246.80	10,618.00
Cities Total	35,563.20	30,385.40	10,911.90	76,860.50	34,776.40	32,824.20	9,038.10	76,638.70	37,283.60	44,850.40	9,016.20	91,150.20	44,873.20	63,415.20	11,926.20	120,214.60	45,742.50	66,705.00	13,804.90	126,252.40
V. Cottage Grove	1,429.60	10.70	111.70	1,552.00	712.10	223.60	116.20	1,051.90	857.00	1,615.40	113.80	2,586.20	638.60	30.40	339.60	1,008.60	825.40	1,176.20	134.50	2,136.10
V. Cross Plains	423.00	1,179.70	74.80	1,677.50	513.20	895.10	-	1,408.30	569.80	235.90	124.60	930.30	410.70	2,722.70	81.90	3,215.30	607.00	436.90	67.00	1,110.90
V. DeForest	375.70	2,147.20	348.50	2,871.40	519.30	2,217.60	883.00	3,619.90	644.00	1,796.30	155.90	2,596.20	654.80	6,107.10	853.50	7,615.40	776.60	2,568.00	192.30	3,536.90
V. Maple Bluff	201.00	292.50	57.10	550.60	153.00	300.90	58.90	512.80	134.70	9.00	33.00	176.70	172.50	8.10	28.50	209.10	160.80	3.00	34.00	197.80
V. McFarland	747.90	420.60	114.00	1,282.50	682.80	868.90	119.90	1,671.60	890.00	1,924.20	109.60	2,923.80	781.90	3,629.30	524.50	4,935.70	763.50	568.90	189.50	1,521.90
V. Oregon	794.80	883.70	719.60	2,398.10	715.00	1,589.50	340.30	2,644.80	833.00	913.20	207.40	1,953.60	858.20	2,284.60	250.80	3,393.60	985.40	482.50	409.30	1,877.20
V. Shorewood Hills	214.60	1,019.60	22.40	1,256.60	211.40	650.10	32.60	894.10	770.80	289.40	26.10	1,086.30	194.80	96.30	21.90	313.00	279.20	1,966.30	24.60	2,270.10
V. Waunakee	1,109.30	901.50	499.60	2,510.40	1,237.70	5,048.80	853.80	7,140.30	1,134.30	3,157.10	559.70	4,851.10	1,374.70	2,366.20	486.90	4,227.80	1,367.90	1,036.80	483.50	2,888.20
V. Windsor ⁵	371.05	1,235.54	88.19	1,694.79	294.41	484.41	36.87	815.69	565.64	643.20	40.08	1,248.93	387.73	416.79	36.56	841.08	756.87	474.24	42.07	1,273.18
Villages Total	5,666.95	8,091.04	2,035.89	15,793.89	5,038.91	12,278.91	2,441.57	19,759.39	6,399.24	10,583.70	1,370.18	18,353.13	5,473.93	17,661.49	2,624.16	25,759.58	6,522.67	8,712.84	1,576.77	16,812.28
T. Berry ⁶	44.25	25.90	0.05	70.20	80.47	41.71	0.05	122.23	39.81	53.10	0.05	92.96	120.29	228.21	-	348.50	45.40	37.89	0.05	83.34
T. Blooming Grove	149.60	247.90	25.00	422.50	181.40	271.80	35.20	488.40	205.60	202.50	22.50	430.60	354.60	248.70	83.70	687.00	173.10	154.40	21.20	348.70
T. Bristol ⁷	236.73	296.42	9.33	542.48	241.94	570.8	9.41	308.43	151.07	154.97	9.33	315.37	391.05	-	2.53	393.58	363.34	-	13.24	376.58
T. Burke	264.30	255.90	11.10	531.30	225.30	96.00	13.30	334.60	397.90	662.70	12.40	1,073.00	232.00	597.90	7.30	837.20	271.20	383.20	6.00	660.40
T. Cottage Grove ⁸	592.07	262.18	1.39	855.65	483.42	398.18	1.47	883.08	396.46	368.21	1.47	766.15	441.66	395.40	1.64	838.70	529.52	760.50	1.47	1,291.49
T. Cross Plains ⁹	106.74	-	0.56	107.30	92.58	6.20	0.59	99.37	687.84	-	0.59	688.42	134.36	0.89	0.59	135.85	118.44	64.50	0.62	183.56
T. Dunkirk ¹⁰	164.09	89.89	5.01	258.99	201.91	92.75	5.14	299.80	217.47	127.77	4.36	349.60	185.77	166.63	7.55	359.95	199.70	78.17	4.30	282.17
T. Dunn	657.30	844.50	13.00	1,514.80	631.20	216.10	13.00	860.30	663.80	268.40	13.20	945.40	636.40	382.60	12.40	1,031.40	772.40	339.90	12.00	1,124.30
T. Madison	350.70	-	49.10	399.80	295.00	165.80	39.30	500.10	243.80	-	41.40	285.20	277.90	24.80	36.50	339.20	318.40	-	37.20	355.60
T. Middleton	834.10	498.40	53.60	1,386.10	639.10	559.50	77.30	1,275.90	680.70	1,402.60	251.20	2,334.50	641.80	941.30	305.30	1,888.40	741.40	418.90	184.60	1,344.90
T. Oregon ¹¹	145.10	109.78	-	254.88	161.40	94.79	-	256.19	165.69	127.85	-	293.54	167.36	273.90	-	441.26	138.14	94.11	-	232.26
T. Pleasant Springs ¹²	386.62	209.56	1.82	598.00	447.24	-	0.65	447.90	435.65	-	0.52	436.17	722.83	-	0.59	723.42	726.02	-	0.65	726.67
T. Rutland ¹³	169.44	93.34	1.05	263.83	85.37	101.67	1.05	188.09	90.08	105.15	0.76	195.99	87.69	90.91	1.56	180.16	85.26	124.67	0.83	210.76
T. Springfield ¹⁴	340.89	151	1.46	343.87	289.96	3.63	1.46	295.06	343.52	7.27	1.46	352.25	239.88	-	1.26	241.14	123.07	105.71	1.51	230.29
T. Sun Prairie ¹⁵	264.46	-	-	264.46	245.26	8.56	-	253.82	391.37	2.54	-	393.91	397.79	11.84	2.01	411.64	177.02	123.70	-	300.72
T. Verona ¹⁶	180.96	259.61	2.42	442.99	1,272.46	220.04	2.26	1,494.76	185.24	235.95	0.32	421.52	253.96	277.54	1.05	532.55	327.04	151.00	1.94	479.98
T. Vienna ¹⁷	491.42	75.26	1.90	568.58	247.44	107.41	2.77	357.62	290.69	110.32	2.17	403.17	276.27	184.43	0.54	461.24	363.51	356.13	1.96	721.60
T. Westport	1,109.20	-	3.90	1,113.10	1,350.00	-	3.70	1,353.70	684.60	-	4.60	689.20	496.60	-	4.10	500.70	634.70	875.10	3.30	1,513.10
Towns Total	6,487.98	3,270.15	180.70	9,938.83	7,171.45	2,441.24	206.66	9,819.35	6,271.28	3,829.34	366.34	10,466.95	6,058.21	3,825.05	468.61	10,351.87	6,107.66	4,067.89	290.88	10,466.42
MPO PL Area Total	55,778.3	47,420.8	14,659.7	117,858.8	55,515.6	53,540.7	12,618.7	121,675.0	59,377.0	75,513.4	11,568.3	146,458.6	67,860.6	95,918.7	15,898.2	179,677.5	68,186.5	97,173.6	16,030.5	181,390.6

¹ (Highway Maintenance and Administration) Roadway operations and maintenance costs, including costs for engineering, highway equipment, and buildings. For county, includes depreciation for equipment and buildings.

² (Highway Construction) Includes operating expenditures and capital costs for constructing roadways. ³ (Road Related Facilities) Includes operating expenditures and capital costs for road related facilities costs, including limited purpose roads, street lighting, sidewalks, storm sewers, and parking facilities.

⁴ Area in MPO area estimated at 89.19%.

⁹ Area in MPO area estimated at 30.86%.

¹⁴ Area in MPO area estimated at 50.48%.

⁵ Area in MPO area estimated at 76.49%.

¹⁰ Area in MPO area estimated at 65.09%.

¹⁵ Area in MPO area estimated at 66.90%.

⁶ Area in MPO area estimated at 24.93%.

¹¹ Area in MPO area estimated at 45.16%.

¹⁶ Area in MPO area estimated at 80.75%.

⁷ Area in MPO area estimated at 72.35%.

¹² Area in MPO area estimated at 65.12%.

¹⁷ Area in MPO area estimated at 67.68%.

⁸ Area in MPO area estimated at 81.88%.

¹³ Area in MPO area estimated at 36.22%.

Note: Costs rounded to nearest \$1,000. ⁴² indicates zero or no data available.

Source: Wisconsin Dept. of Revenue, County and Municipal Revenues and Expenditures Reports.

Figure 5—a Historical County and Municipal Street/Roadway Expenses (\$1,000's) within the Madison Metropolitan Planning Area

- State Highway Rehabilitation (SHR) program, which funds maintenance work on existing state highways along with safety and minor capacity improvements;
- Highway System Management and Operations (HSMO) program, which funds activities to ensure the proper functioning and safety of the state highway system, including traffic operations and management of the State Traffic Operations Center; and
- Majors program, which funds the most complex and costly projects, often involving capacity expansion, to address the most serious deficiencies on the most important state highways.

Figure 5-b shows the annual federal and state funding program revenue estimates (in current dollars), in most cases based on recent funding levels over the past 5-6 years (2016-2021), but modified by the federal program funding increases provided by the IIJA, which are assumed to continue moving forward. WisDOT provided the data on recent federal and state program funding. For state highway construction, estimated annual funding for Majors program, backbone and non-backbone highway projects, and bridge projects is \$52.7 million, while estimated funding for state highway maintenance and operations is \$9.1 million, for a total of \$61.8 million. Estimated annual federal funding for local roadway and bridge construction projects is \$13 million, including \$9 million in STBG Urban funding through the MPO.

Annual State Highway and Local Roadway Revenue Estimates (\$1,000s) for the Metropolitan Planning Area

Roadway Construction	Funding Program	Avg. Annual Funding (\$1,000s)
State Highways		
Federal/State Funding	STH Expansion - Majors Program	\$23,932
	Combined Backbone and non-Backbone	\$27,547
	State Highway Rehabilitation Bridges	\$1,213
Subtotal of State Highways		\$52,692
Local Roadways		
Federal Funding	Surface Transportation Block Grant (STBG) Urban	\$8,986
	Highway Safety Improvement Program (HSIP)	\$1,488
	Bridge Program	\$2,480
State Funding	70 % General Transportation Aids (GTA)	\$18,739
	70% Connecting Highway Aids (CHA)	\$420
	Local Road Improvement Program	\$658
Local Funding	Total County/Local Revenue (from State Department of Revenue) less Federal/State Funding Estimate	\$59,003
Subtotal of Local Roadways		\$91,774
Subtotal		\$144,466
Roadway Maintenance and Operations	Funding Program	Avg. Annual Funding (\$1,000s)
State Highways		
Federal/State Funding	State Highway Maintenance and Operations	\$9,060
Local Roadways		
State Funding	30% General Transportation Aids	\$8,031
	30% Connecting Highway Aids	\$180
Local Funding	Total County/Local Revenues (from State Department of Revenue) less Federal/State Funding Estimate	\$53,189
Subtotal of Local Roadways		\$61,400
Subtotal		\$70,460
Total		\$214,926

Figure 5-b Annual State Highway and Local Roadway Revenue Estimates (\$1,000s) for the Metropolitan Planning Area

Estimated annual state funding is \$19.8 million with the vast majority of this coming from the General Transportation Aids program. Estimated annual local funding is \$59 million for a grand total of \$91.8 million. Estimated annual funding for local roadway maintenance and operations is \$61.4 million, including \$8.2 million in state funding and the rest local. Estimated local funding for local roadway construction and operations and maintenance was estimated by subtracting past federal/state funding from total average revenues from 2015–2019, the latest years for which data was available.

PUBLIC TRANSIT FUNDING

The major transit operator in the Madison area is Metro Transit, which is owned by the City of Madison and operates within the oversight of the Mayor, Common Council, and the City's Transportation Commission. Metro contracts with other municipalities and public institutions (including UW–Madison, UW Health, and the Madison Metropolitan School District) to provide service for their constituents.

Metro's capital and operating costs are funded through a combination of federal funding, state operating assistance, passenger fares, and local funds primarily derived from the property tax. Federal funding may be used for capital project expenses, preventive maintenance costs, and a portion may be used for complementary paratransit service for persons unable to use fixed-route transit.

The majority of Metro's federal funding comes from the Section 5307 Urbanized Area Formula Program (UAFP), which is apportioned based on revenue vehicle-miles, population, and population density. Metro's FFY 2021 apportionment of Section 5307 UAFP funding was \$7.2 million. Metro also receives Federal Section 5337 State of Good Repair and Section 5339 Bus and Bus Facilities Formula Program funding. Funding for the Section 5337 program is based on the miles of bus lanes and other dedicated transit facilities, such as the State Street pedestrian and transit mall, while funding for the Section 5339 program is based on urbanized area population and bus passenger-miles traveled divided by operating costs. Metro's FFY 2021 apportionment for these two programs combined was \$1.7 million. Two discretionary components to the Section 5339 program were added under the FAST Act: a bus and bus facilities program based on asset age and condition and a low or no emissions bus deployment program. The Infrastructure Investment and Jobs Act (IIJA) adds 27% to Metro's 5307 program allocation and

24% to the 5339 program allocation beginning in FFY 2022. Inflationary increases to these higher program allocations are assumed moving forward.

Funding, in particular operating funds, has been and continues to be a major challenge for Metro. At one time in the mid-1990s state operating assistance covered 45% of Metro's operating budget; however, state funding has been relatively flat and in 2019 state assistance covered just 31.5% of operating expenses for the system. Figure 5-c shows the distribution of Metro's operating revenue from 2016–2020. In the 2016–2019 period, the percent covered by local funding decreased slightly from 33.2% to 29.8%, and the percent covered by fares increased from 23.8% to 27.0%. The COVID-19 pandemic resulted in very different 2020 operational funding, with fares and directly generated funding decreasing to 16.3%, local funding decreased

Metro Operating Revenue Summary, 2016–2020

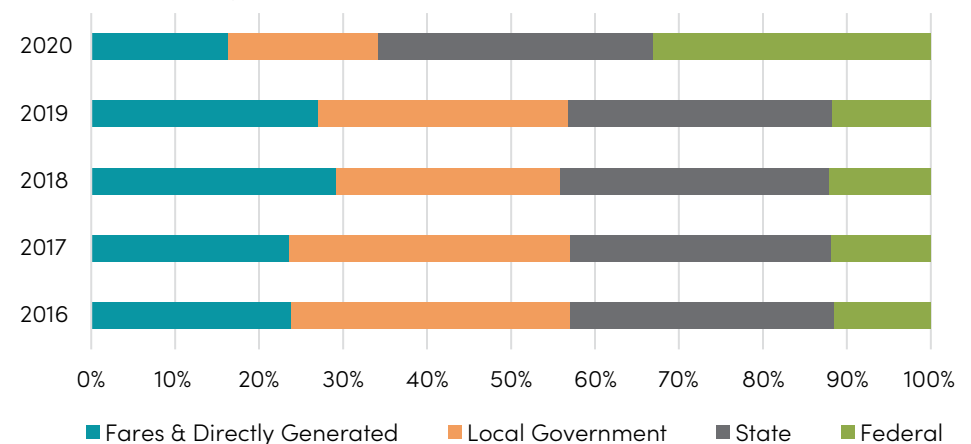


Figure 5-c Metro Operating Revenue Summary, 2016–2020

to 17.9%, and federal support increased to 33.0%.

Given flat state funding and tight local budgets, in part due to the state expenditure restraint program, and the many other competing demands for property taxes, it will become increasingly difficult for Metro to cover inflationary operating cost increases in the future let alone meet the service improvement and expansion needs of the growing metro area and address its capital needs, including bus replacements. Because Metro has had to use the majority of its federal funding for eligible operating expenses, this has put a squeeze on its capital budget. A regional transit governance structure with a dedicated local source of transit funding will be required in order to make major regional service improvements such as building out the full BRT system, initiating express commuter service to outlying communities, and increasing service frequency in the core area.

The state legislature adopted legislation in 2009 authorizing the creation of the Dane County Regional Transit Authority (DCRTA) with the authority to implement a local sales tax of up to ½ percent. The DCRTA was formed in 2010 and, with the help of City of Madison, Metro, and MPO staff, developed a draft short-term plan for improved transit service to support a referendum on a ¼ percent sales tax. However, Assembly Bill 40 (Act 32) was passed in 2011, eliminating the RTA authorizing legislation and dissolving the DCRTA.

Lacking enabling legislation for a regional transit authority, in 2020 the City of Madison adopted a new motor vehicle registration fee (VRF), which replaces \$3.6 million/year in Metro funding that had previously come from property tax revenue, adds \$2.7 million to address increasing operational costs, and provides \$1.5 million for expanded transit service including BRT.³ Dane County also collects a VRF, a portion of which could conceivably be used to support the provision

³ See <https://www.cityofmadison.com/transportation/documents/VRF/VRF.pdf>

of transit service to areas and communities outside the current Metro service area. While regressive, VRFs have the potential to close the funding gap for incremental system growth while a long-term funding solution to regional transportation needs is secured.

Figure 5-d shows Metro Transit's average annual capital and operating revenue estimates based on 2016–2019 funding taken from the agency's National Transit Database (NTD) reports and an adjustment to federal formula program funding (Section 5307, 5337, and 5339) to reflect IIJA increases, which are

Annual Transit Revenue Estimates for the Metropolitan Planning Area

Metro Transit	Funding Program	Avg. Funding ¹
Capital		
Federal Funding	Urbanized Area Formula Program (5307), State of Good Repair Formula Program (5337), Bus & Bus Facilities Formula Program (5339)	\$5,819,008
Local Funding	City of Madison Property Taxes and Cooperative Agreements with Neighboring Municipalities	\$4,751,550
<i>Subtotal</i>		\$10,570,558
Operating		
Federal Funding	Urbanized Area Formula Program (5307), Special Needs/ADA (5310)	\$8,076,490
State Funding	State Operating Assistance	\$17,373,811
Local Funding	City of Madison Property Taxes and Cooperative Agreements with Neighboring Municipalities, and Other Revenues	\$16,974,631
Fares & Directly Generated	Collections on Buses, Transit Passes, Advertising, etc.	\$14,235,511
<i>Subtotal</i>		\$56,660,444
Total		\$67,231,002

¹ Includes adjustment to federal funding to reflect increases in Federal funding under IIJA.

Figure 5-d Annual Transit Revenue Estimates for the Metropolitan Planning Area

assumed to carry forward into the future. Between 2016 and 2019, capital revenues fluctuated considerably year-to-year, ranging from a low of \$6.8 million in 2016 to a high of \$14.4 million in 2019, averaging \$9.4 million annually. Operating revenues were held relatively flat year-to-year, ranging from \$54.2 million in 2018 to \$55.8 million in 2017, with a 4-year average of \$55 million. This mirrored relatively small changes in service hours between 2016 and 2019, with a high of 406,400 in 2018 and a low of 403,600 in 2019. The four-year average for capital and operating revenues combined was \$64.4 million. Including increased formula funding under the IIJA, which will increase 24-27%, the average annual combined capital and operating revenues are estimated to increase to \$67.2 million.

BICYCLE AND PEDESTRIAN FUNDING

Local sources provide most of the funding used for off-street bicycle and pedestrian facilities. This includes Dane County’s PARC & Ride grant program, which has provided a total of over \$2 million in three of the past six years⁴ for grants to local communities for bicycle trail projects or an average of \$333,000 per year. Federal funding for off-street bicycle and pedestrian facilities is provided primarily through the Transportation Alternatives Program (TAP). The MPO receives an allocation of TAP funds, which it directs towards projects it selects. The

⁴ 2015, 2018, and 2021; 2022 awards were being finalized at the time of this writing.

MPO’s annual allocation of funding has been \$617,000, but will double to \$1.24 million under the IIJA. WisDOT also receives a TAP funding allocation, which it uses to fund projects throughout the state. Madison area projects are also eligible for this statewide pool of funds, and at least one Madison area project has been awarded statewide funding in each of the past two program cycles, with total TAP funding for area projects averaging approximately \$200,000 in each of the last four years. The state’s allocation of TAP funding will also double under IIJA. Factoring in the increases in IIJA funding for the MPO and state, it is estimated that the average annual TAP funding will be around \$1.64 million.

Off-street bicycle facilities, such as grade-separated crossings and side paths, have also been included in recent years as part of street construction projects funded by the MPO through the federal STBG (formerly STP) Urban program. However, this funding through street or highway projects has not been included as part of the revenue estimate.

Annual Off-Street Bicycle and Pedestrian Facilities Funding Estimates (\$1,000s) for the Metropolitan Planning Area

Bicycle and Pedestrian Facilities	Funding Program	Average Annual Funding
State and Local Funding	DNR, Dane County PARC and Ride Bicycle Grant Program, Local municipal, Other	\$7,019
Transportation Alternatives	STBG - Transportation Alternatives Program (TAP) Set Aside (MPO and WisDOT)	\$1,640
Total		\$8,659

Figure 5-e Annual Off-Street Bicycle and Pedestrian Facilities Funding Estimates (\$1,000s) for the Metropolitan Planning Area

Figure 5-e shows the estimated annual revenue for off-street bicycle facility projects based on the average annual amount of local, state, and other funding for new path projects programmed in the TIP from 2018 to 2022 and the expected TAP funding with the increase in funding under IIJA.

Projected Revenues through 2050

Figure 5-f shows the projected total transportation revenues for state highway, local roadway, transit, and bicycle/pedestrian facility projects for the next 28-year period from 2022 to 2050. The estimated revenues are based on the average annual estimates in Figures 5-b, 5-d, and 5-e, which, as noted, are based on recent and programmed funding levels, as well as the federal funding program increases in IIJA. Inflationary increases to the revenue sources are assumed. It is estimated that a total of almost

Estimated Transportation Revenue, 2022 – 2050 (\$1,000s) for the Metropolitan Planning Area

Source	2022-2026	2027-2035	2036-2050	Total
Roadway Construction				
State Highways				
Federal/State Funding	\$274,211	\$567,487	\$1,202,342	\$2,044,040
Local Roadways				
Federal Funding	\$67,413	\$139,513	\$295,588	\$502,515
State Funding	\$103,128	\$213,427	\$452,190	\$768,746
Local Funding	\$319,579	\$759,698	\$2,045,892	\$3,125,170
<i>Subtotal of Local Roadways</i>	<i>\$490,121</i>	<i>\$1,112,639</i>	<i>\$2,793,671</i>	<i>\$4,396,430</i>
Subtotal of Roadway Construction	\$764,332	\$1,680,126	\$3,996,012	\$6,440,471
Roadway Maintenance and Operations				
State Highways				
Federal/State Funding	\$47,149	\$97,575	\$206,734	\$351,458
Local Roadways				
State Funding	\$42,730	\$88,432	\$187,361	\$318,523
Local Funding	\$285,224	\$654,997	\$1,661,295	\$2,601,517
<i>Subtotal of Local Roadways</i>	<i>\$327,955</i>	<i>\$743,429</i>	<i>\$1,848,656</i>	<i>\$2,920,040</i>
Subtotal of Maintenance and Operations	\$375,103	\$841,004	\$2,055,390	\$3,271,497
Metro Transit				
Capital				
Federal Funding	\$167,128	\$188,500	\$271,530	\$627,158
Local Funding	\$95,548	\$109,344	\$103,822	\$308,713
<i>Subtotal of Capital</i>	<i>\$262,676</i>	<i>\$297,844</i>	<i>\$375,352</i>	<i>\$935,872</i>
Operating				
Federal Funding (does not include capital funds used for eligible operating expenses)	\$8,770			\$8,770
State Funding	\$81,642	\$187,111	\$396,434	\$665,187
Local Funding	\$105,884	\$186,471	\$395,079	\$687,434
Farebox	\$80,735	\$177,849	\$379,090	\$637,673
<i>Subtotal of Operating</i>	<i>\$277,030</i>	<i>\$551,431</i>	<i>\$1,170,603</i>	<i>\$1,999,065</i>
Subtotal of Metro Transit	\$539,706	\$849,275	\$1,545,955	\$2,934,936
Bicycle and Pedestrian Facilities				
On-Street Facilities	----included as part of street project funding----			
Off-Street Facilities				
Federal/State Funding	\$8,705	\$18,016	\$38,170	\$64,892
Local Funding	\$37,259	\$77,108	\$163,370	\$277,736
<i>Subtotal of Off-Street Facilities</i>	<i>\$45,964</i>	<i>\$95,124</i>	<i>\$201,540</i>	<i>\$342,628</i>
Subtotal of Bicycle and Pedestrian Facilities	\$45,964	\$95,124	\$201,540	\$342,628
Total Projected Revenue	\$1,725,105	\$3,465,529	\$7,798,897	\$12,989,532

Figure 5-f Estimated Transportation Revenue, 2022 – 2050 (\$1,000s) for the Metropolitan Planning Area

\$13 billion will be available to finance projects over the 28-year planning period. This includes \$6.4 billion for roadway construction, \$3.3 billion for roadway operations and maintenance, \$2.9 billion for transit, and \$343 million for multi-use path construction.

The average annual federal and state roadway revenue estimates are based on a 6-year rolling average⁵ of expended funds between 2016 and 2021 obtained from WisDOT. A percentage increase in the federal funding was applied based on the percentage increase in federal programs (NHPP, HSIP) funding under the IIJA. Local roadway revenue estimates are based on the 5-year average of expended funds from 2015–2019 obtained from State Department of Revenue reports, subtracting out federal and state funding received. An additional 2% annual increase beyond the 2% inflationary factor (4% total) was assumed for local construction funding and 1.5% for operations and maintenance funding, reflecting additional property tax revenue from new growth. The increases were necessary to provide sufficient revenues to cover estimated expenses accounting for the growth in street lane miles.

Metro Transit capital (federal and local) and operating (federal, state, local) revenues are based on programmed expenditures for years 2022–2026 due to the unique nature of these years with the East-West BRT project. Revenues are based on the 4-year average from 2015–2019 in the agency's National Transit Database (NTD) reports for remaining years, with an adjustment to the federal funding to account for increases under IIJA.⁶ As noted above, federal funding for off-street bicycle and pedestrian facilities is based on the MPO's FY 2022 allocation of TAP funding under IIJA and estimated amount of statewide TAP funding the region will receive with the increase under IIJA and recent experience with local projects receiving grants. State, local, and other funding is based on the average funding programmed from 2018–2022 for bicycle path projects.

Average annual funding levels were extrapolated to 2050 using an inflation rate of two percent. Funds were then divided into three time

⁵ 5-year rolling average period for the General Transportation Aids and Connecting Highway Aids programs. Local Bridge program funding is based on average annual project funding programmed for FY 2021–25. Majors program funding is based on average annual amount enumerated for projects from FY 2022–2026.

⁶ Year 2020 data was excluded due to the unique budget situation that year due to COVID-19.

periods (2022–2026, 2027–2035, and 2036–2050) reflecting programmed projects over the next five years, the following eight (8) years to 2035, and the final fifteen (15) years to 2050. A larger increment was used for the final 15 years due to the greater uncertainty that far out into the future.

Projected Expenses through 2050

Figure 5-g shows projected transportation expenses. Expenses are estimated at \$12.5 billion for the planning period. Separate methodologies, detailed below, were developed to determine future expenses for roadway construction, maintenance, and operations; Metro Transit capital and operating costs; and off-street multi-use path and grade-separated bicycle/pedestrian crossing facilities.

ROADWAY CONSTRUCTION, MAINTENANCE, AND OPERATIONS

To begin the process of projecting expenses for construction and maintenance and operations of the roadway network in the region, the revenue analysis was coupled with a pavement condition analysis to compare funding levels from 2015 to 2019 with the trend in pavement conditions over that same time period for all roadways by jurisdiction (state, local) and functional classification (arterial, collector, local). For the state highway system, Interstate and U.S. Highway pavement conditions in the Metropolitan Planning Area

improved over this time period, while State Trunk Highway pavement conditions got worse. The measure used to assess the condition of state highways is Pavement Condition Index (PCI), which reflects the structural integrity of the roadway. PCI was developed by the US Army Corps of Engineers, and is based on a visual survey of the number and types of distresses in the pavement.⁷

⁷ The federally mandated performance measures for pavement condition are the percentage of Interstate Highway and non-Interstate National Highway System (NHS) highways in good and poor condition. Good and poor condition is determined based on three metrics: cracking percent, international roughness index (IRI), and rutting (for asphalt pavement sections) or faulting (for joined concrete pavement sections). The MPO has thus far been unable to calculate the federal pavement measure due to issues regarding data quality and extent of data coverage. The PCI measure has been used by the state for many years and was determined to be most appropriate for this analysis. The MPO will begin tracking and reporting on the federal measure when the data issues have been resolved.

Estimated Transportation Expenses, 2022 – 2050 (\$1,000s) for the Metropolitan Planning Area

Source	2022 2026	2027 2035	2036–2050	Total
Roadway Construction				
State Highways	\$274,211	\$567,487	\$1,202,342	\$2,044,040
Local Roadways	\$482,098	\$1,097,591	\$2,801,400	\$4,381,089
Subtotal	\$756,309	\$1,665,078	\$4,003,741	\$6,425,129
Roadway Maintenance and Operations				
State Highways	\$47,149	\$97,575	\$206,734	\$351,458
Local Roadways	\$333,308	\$741,813	\$1,828,269	\$2,903,390
Subtotal	\$380,456	\$839,388	\$2,035,003	\$3,254,848
Metro Transit				
Capital Expenses	\$211,954	\$536,808	\$270,694	\$1,019,455
Operating Expenses	\$200,880	\$412,190	\$846,489	\$1,459,559
Subtotal	\$412,834	\$948,997	\$1,117,183	\$2,479,015
Bicycle and Pedestrian Facilities				
On-Street Facilities	----included as part of street project funding----			
Off-Street Facilities	\$25,280	\$95,124	\$201,540	\$321,944
Subtotal	\$25,280	\$95,124	\$201,540	\$321,944
Total Projected Expenses	\$1,574,879	\$3,548,588	\$7,357,467	\$12,480,935

Figure 5-g Estimated Transportation Expenses, 2022 – 2050 (\$1,000s) for the Metropolitan Planning Area

Local roadway pavement conditions — as measured by a similar rating system as PCI called Pavement Surface Evaluation and Rating or PASER—got worse overall from 2015 to 2019. There was a small improvement for arterial roadways, but the percentage of collectors and local roadways — which

make up the vast majority of mileage — in fair and poor condition increased. In 2019 the percentage of the local roadway system in poor condition ranged from 5% for arterials to 16% for local roads. The percentage of the local system in fair condition ranged from 16% for arterials to 38% for local roads. The percentage of the local system in fair condition ranged from 31% for arterials to 38% for local roads. The overall much better condition of state highways can be tied to state funding priorities and local funding challenges. The state has just recently increased the percent of the state transportation budget going to local roadway programs.

Figure 5-h shows the pavement condition of state highways by type and local roadways by functional classification in 2015 and 2019.

Next, average per lane mile roadway construction and maintenance and operations costs were calculated for local roadways within the City of Madison, other metropolitan area cities and villages, area towns, and county highways by taking the total lane miles and dividing that by the annual costs in 2015, 2017, and 2019 and then averaging the cost per mile for those years. Average construction cost was highest for Dane County at \$29,360 per lane mile. City of Madison and suburban city/village costs were similar at \$20,750 and \$22,290 respectively while town costs were much cheaper at \$3,800. Dane County also spent the most per lane mile on maintenance and operations at \$19,020 followed by Madison at \$16,160, suburban cities and villages at \$12,170, and towns at \$5,940. The much lower town costs reflect the rural nature of those roads

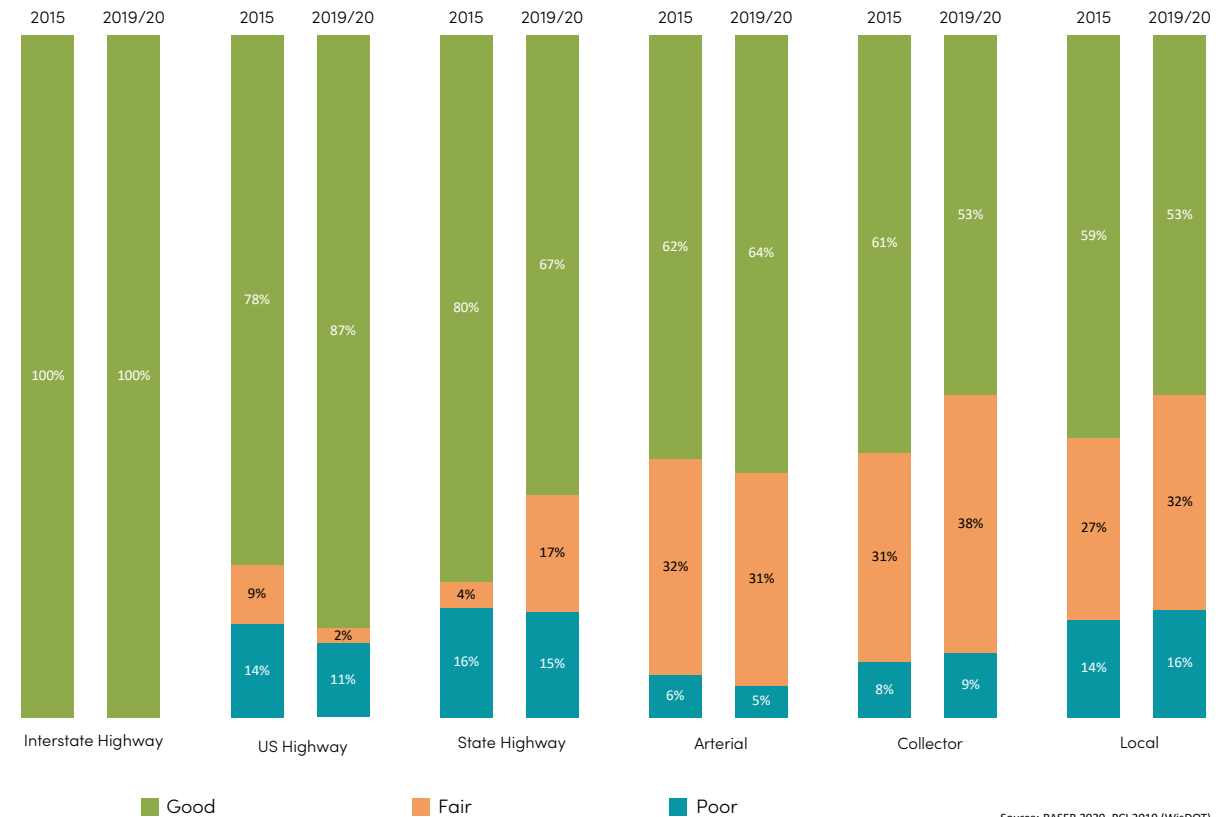
without pedestrian and bicycle facilities, street lights, etc.

A lane mileage growth factor was calculated by comparing year-over-year growth of the local roadway network (arterials, collectors, local streets) for Dane County, City of Madison, suburban cities and villages, and towns. The mileage in towns actually showed a declining trend due to annexations. The number of lane-miles grew at a rate of 0.88%

in the City of Madison and 2.99% in suburban cities and villages, reflecting the faster percentage growth in the suburbs and in particular peripheral growth with new street construction. The growth rates, lane mileage costs, and inflation factor of 2 percent were applied for construction and operations and maintenance and extrapolated out to 2050.

Using these assumptions, it is projected that \$4.4 billion will be needed for local roadway

Pavement Condition by Roadway Type in the Madison Metropolitan Planning Area



Source: PASER 2020, PCI 2019 (WisDOT)

Figure 5-h Pavement Condition by Roadway Type in the Madison Metropolitan Planning Area

construction over the 28-year planning period to 2050, while \$2.9 billion will be needed for maintenance and operations. As noted, local roadway revenue will need to increase 4% annually (including a 2% inflationary factor) for construction and 3.5% annually for operations and maintenance from the recent annual average in order to provide sufficient revenue to cover expenses. With this assumption, projected local roadway revenues are \$4.4 billion for construction and \$2.9 billion for maintenance and operations. However, this would result in a continued slow deterioration of local roadway conditions based on recent trends. Revenue and spending would need to be increased in order to improve or even maintain current roadway conditions. That increased spending would help ensure that roadways receive preventive maintenance before significant deterioration, which can add 15-20 years of useful life at a substantial cost savings over reconstruction. Even with timely maintenance, streets eventually need to be reconstructed and utilities replaced.

Figures A-c and A-d in Appendix A include lists of programmed, planned, and other potential needed future local arterial reconstruction projects based on current roadway condition, the year a roadway was originally constructed (where that data was available), and assumed future development. The figures also include some programmed and planned projects to improve traffic operations and safety. The total inflation adjusted cost of these local roadway projects

over the planning period is \$441 million. This includes some programmed and planned intersection and bridge projects. Some of the identified potential roadway reconstruction projects are in peripheral developing or planned development areas that will need to be reconstructed to urban standards, but many are in existing older already developed areas.

Figures A-a and A-b include lists of programmed and planned local arterial capacity expansion projects. The cost of these projects totals \$232 million in inflation adjusted dollars over the planning period. The estimated expenses for local roadway construction accounts for growth in lane miles so the cost of these capacity projects as well as the preservation projects should be accounted for in the estimated expenses.

The major source of funding for local arterial reconstruction projects is the Surface Transportation Block Grant (STBG) (formerly STP) Urban program for which the MPO receives an allocation of funding for each multi-year program cycle. The total amount of STBG Urban funding projected to be available over the 28-year planning period is \$349 million, assuming 2% annual inflationary increases in funding. Using the current 60/40 cost share policy of the MPO, this would fund projects totaling \$582 million. This would cover 89% of the local arterial reconstruction projects (both capacity expansion and preservation) identified. Some of the projects listed will be funded locally and so even though some STBG Urban funding has been

and will be used for other types of projects, this demonstrates the feasibility of funding the major regional local arterial reconstruction project needs.

Recent trends demonstrate excellent pavement conditions on the Interstate system and improving conditions on U.S. Highways, but declining conditions on the State Trunk Highway System. This analysis assumes that construction and maintenance and operations will continue at recent expenditure levels, but with an increase in federal funding as included in the IIJA and with a 2% inflationary growth factor. As previously noted, state funding for roadway





construction has actually been declining in constant dollars since 2006 when state gas tax indexing was eliminated. The trend in pavement condition of the state and local roadway systems will continue to be monitored to determine whether the trend of declining condition is reversed or if the current condition can at least be maintained. This will require increased investment in roadway preservation.

For state highway construction expenditures, programmed and other near-term planned projects have been identified with costs estimated using the 2% annual inflationary factor. The projects are included in the

Figures A-a through A-d in Appendix A. The programmed major projects include the Beltline Flex Lane project, which is almost completed, the U.S. Highway (USH) 51 (McFarland to Stoughton) project which is scheduled for construction in phases in 2025–2028, and the USH 12/18 and CTH AB interchange. A major planned project is the reconstruction of Park Street (USH 151), a state connecting highway, which will need to be coordinated with the planned North/South BRT project.

Future Major Highway Development program projects, which often involve a capacity expansion and must be recommended for enumeration by the state Transportation Projects Commission (TPC) and enumerated by the Legislature and Governor, are not known at this time. Studies are currently ongoing for the Beltline, Stoughton Road (USH 51), and the Interstate north of the Beltline. The recommended scope of improvements for these corridors have not been determined. Once the studies are completed, the specific improvements identified, costs estimated, and Major Highway Development program funding either secured or determined to be reasonably likely to be available, the plan will be amended to add the project(s) with an updated financial analysis. The plan does recommend one additional major corridor study for the STH 19/STH 113/CTH M/CTH K corridor at some point in the future, likely after 2035. The plan does include a capacity expansion in the CTH K corridor, potentially

off alignment, with an interchange at USH 12, which is part of this longer corridor.

Based on the funding for the Madison area projects enumerated in the Major Highway Development program for FYs 2022–2026 for the USH 51 and Interstate, if averaged out over five years, a total of \$928 million in inflation adjusted funding could be expected to be available during the planning period. Depending upon the scope of improvements, this could potentially cover some or all of the costs of two major projects, but probably not projects in all three corridors currently being studied. However, Major funding is awarded on a competitive basis statewide and both the Interstate and Beltline projects would rate high in terms of importance. Given the needs in the rest of the state, including the southeast area freeway system, it is probably safe to say additional state funding would be needed to cover the cost of major projects in all three corridors, not to mention any major improvements in the STH 19 corridor while at the same time addressing preservation needs on the state highway system.

It is estimated that a total of \$2.04 billion in funding will be available for state highway construction over the planning period and another \$351 million for maintenance and operations. The total cost of programmed state highway projects and studies for 2022–2026 is \$181 million. The cost of other near-term planned projects is another \$158 million. Because the list of Major Highway Development program projects and other state highway construction projects



addressing safety and preservation is very incomplete, and there is no way to realistically estimate all future state highway system expenses, it is assumed that all available funding for construction will be expended and thus expenditures were set to match revenues. If the average annual programmed funding was extrapolated out for the 28-year planning period it would result in expenditure of a little over \$1 billion, leaving another \$1 billion available for Major Highway projects that come out of the current Beltline, Stoughton Road, and Interstate studies.

PUBLIC TRANSPORTATION

Capital Costs

The single largest recurring capital expense for Metro Transit is for the purchase of replacement buses. Metro typically replaces buses on a cycle of about 15 years. With a fleet of just over 200, it purchases about 15 new buses per typical year. The usual 2021 bus procurement was deferred to support the purchase of 43 60-foot articulated buses for the BRT system in 2022. Metro currently “retires” older buses from all-day service to peak-only or other limited services, allowing them to minimize new bus purchases. The draft plan in the Metro Network Redesign dramatically reduces peak-only service and expands the number of buses that will be in service all day, which will result in Metro’s needing to replace vehicles more frequently than is currently the practice. Although the number of buses in service for the full service day will increase, the total number of buses required to provide peak period service will be reduced by flattening service levels throughout the day. This will reduce Metro’s required fleet size, offsetting the higher cost to replace buses more frequently.

Other major capital costs include: the ongoing renovation of Metro’s East Washington Ave. maintenance facility; the remodeling of Metro’s new satellite facility on Hanson Road; the construction of East/West Bus Rapid Transit (BRT) facilities; the planning, design, and construction of North/South BRT; and, implementation of new fleet technology

and fare collection systems. Maintaining Metro’s fleet replacement schedule, facility renovation and remodeling, both the East/West and North/South BRT routes, technology upgrades, and other usual capital expenses can be covered with projected revenues based on recent funding trends and the adopted 2022–2026 TIP.⁸ This assumes that Metro is successful in obtaining another Small Starts grant to cover an assumed 50% of the North/South BRT project. FTA awarded Metro a \$6.4 million Buses and Bus Facilities grant for East Washington Ave. maintenance and administrative facility renovations in March 2022.⁹

There are some major new capital costs that will require significant additional funding in order to fully implement the recommended transit system improvements. New buses in the future will be predominantly electric, and will require the construction of charging infrastructure in strategic locations to support the use of these vehicles throughout the system. With more buses in service throughout the day, keeping electric buses charged may require the operation of additional vehicles to provide service during charging periods.

⁸ Due to the historic level of funding required to implement East/West BRT and the unique changes in 2020 funding resulting from the Covid-19 pandemic and federal stimulus packages, figures in the 2022–26 TIP were used for those years; projections for 2027 and beyond are based on 2016–19 averages from annual NTD agency reports adjusted for inflation.

⁹ This grant is not reflected in Figure 5–i, as the TIP will not be amended to include it until after this RTP Update has been adopted.

The extent to which charging requirements drive future fleet needs will depend greatly on charging and battery technology, as well as the provision of adequate charging facilities at strategic locations in the network.

The first phase of the planned BRT system, the East/West corridor, is currently in environmental review and design, with funding for roadway improvements including Transit Signal Priority (TSP), the construction of stations, the first order of 60-foot articulated buses obligated in 2022, and the Hanson Rd renovation project (\$160.8 million total). Additional articulated buses will be ordered in 2023 and 2024 (\$18.1 million), and planning and design for the North/South corridor will begin in 2023 (\$4 million).

Capital funding for East/West BRT is anticipated to be provided in part through a federal Small Starts program grant covering 50% of project costs, which in combination with Metro’s formula funding bring the federal share to \$107 million, with a local share of \$53 million. For the North/South BRT corridor, the city is seeking an Areas of Persistent Poverty planning grant, and anticipates construction funding through a federal Small Starts program grant. The City of Madison has included required local match funding for East/West BRT project and required facilities in its multi-year capital budget. Cost estimates for the East/West corridor were used to estimate costs for the North/South corridor, which is part of the fiscally constrained, federally recognized plan. The new Hanson Rd. facility is necessary for

Metro to be able to efficiently service the fleet, and to house and maintain articulated buses, which will be needed for the BRT system. As part of the BRT system, funding of the Hanson Rd. project (\$21.1 million) is considered part of the local 50% match for Small Starts funding of the East/West BRT.

New articulated and electric buses, as recommended in the plan, are more expensive than the standard 40-foot diesel buses and hybrid-electric buses currently in use. Electric buses have become more common as the technology improves and the price drops. Articulated buses have been in use in the industry for many years. With the new service planned (bus rapid transit, new all-day service, frequency improvements, and regional express service), the fleet size would generally be expected to grow by 2050; however, the Network Redesign draft plan (2022) calls for significantly flattening service levels throughout the day, and re-allocating much of the “extra” 2019 peak service hours to all-day service. This results in a smaller number of vehicles being required to operate peak period service, and accordingly the number of service vehicles in Metro’s fleet is not expected to need to grow substantially by 2050. Where 183 buses were in service during peak periods in 2019, only 190 are anticipated to be required for planned 2050 service; many of these will be larger 60-foot articulated

vehicles with increased capacity over the standard 40-foot vehicles that currently compose the fleet.

Figure 5-i lists the major capital expenses – including buses – necessary to fully implement the recommended transit improvements. The projected revenue vehicle (bus) replacement cycle will not meet the TAMP Useful Life Benchmark (ULB) performance measure target of no more than 11% of the revenue fleet being beyond the ULB of 14 years in 2024–2027; however, the percentage of the fleet past the ULB generally declines through the rest of the planning horizon and is not projected to exceed the adopted performance measure after 2027.

The recent average annual spending on capital needs is about \$10 million,¹⁰ which is

¹⁰ 2016–19 TIP averages

Estimated Expenses for Major Transit Capital Projects to Fully Implement the Regional Transit Plan

Capital Projects	Estimated Costs (\$1,000s)
East/West BRT	\$143,000
North/South BRT	\$124,684
Southwest/East BRT	\$162,636
Middleton BRT	\$121,676
Hanson Road Satellite Facility Remodel	\$21,115
East Washington Facility Renovations	\$10,124
Transit Coaches	\$489,756
Total	\$1,072,991

Figure 5-i Estimated Expenses for Major Transit Capital Projects to Fully Implement the Regional Transit Plan

generally sufficient for meeting Metro's bus replacement needs, but not for expanding or upgrading the fleet. Some expansion of the fleet for new service and/or upgrading of the fleet to electric buses has been made feasible with other federal funding and increased local funding, but implementation of the full suite of planned improvements will not be possible given currently available funding. Metro will need to continue its phased renovation of the East Washington facility and the remodel of the Hanson Road facility in order to meet PTASP and TAM goals, regardless of whether or not North/South BRT or other system expansions are implemented.

While Metro has been able to secure discretionary federal grants for the East-

West BRT, and is leveraging the Hanson Rd facility's purchase and renovation expenses as part of the local match for Small Starts funding, funding the complete list of capital needs identified in the plan — particularly the Southwest/East and Middleton BRT routes — will require a regional funding mechanism.

Operating Costs

Implementing the service improvements recommended in this plan will require an estimated additional 393,000 annual service hours, a 127% increase over the current 309,000 annual service hours. See Figure 5-j. This planning-level estimate includes expansion of BRT service, new all-day service, frequency improvements in developing areas,

and the network of regional express bus routes. Assuming the service improvements are phased in over the approximately 28-year plan timeframe, the increase translates to about 4.5% per year.

This 4.5% growth rate is considerably higher than Metro's historical service hour growth rate of about 0.8% per year 2010 - 2019. During

that time, Metro Transit's operating funding increased an average of 2.4% per year. This increase allowed for some increased service, such as new express service to Sun Prairie, but was only slightly higher than the rate of inflation. Between 2015 and 2019, service hours fluctuated slightly but remained essentially flat; beginning in 2020, the COVID-19 pandemic resulted in a service hour reduction to 77% of the 2019 service level, but this is considered a short-term reduction and Metro anticipates returning to 2019 service levels in the summer 2023.

Historical levels of annual funding increases will not provide the resources necessary to support the transit service recommendations in this plan. If the number of service hours was to increase at the same rate as operating funding has risen — 2.4% per year — Metro would be able to operate about 69,500 additional annual service hours by 2050, about 18% of the new service hours recommended in this plan. The remaining unfunded 314,500 annual service hours will require a new funding source.

Figure 5-k identifies the types of potential revenue generation mechanisms that might be used to fund the expansion of the transit system as well as the estimated annual revenue generation of these sources. An increased vehicle registration fee alone would not be enough to fund the planned transit system, but would allow Metro to make targeted service expansions and pursue needed capital improvements. A ¼ percent sales tax would likely be sufficient to fund

Estimated Annual Service Hours for Recommended Future Regional Transit System

Service Category	Estimated Annual Revenue Service Hours	Estimated Cost (\$1,000s)(2019 \$)
Existing Metro Transit Service	309,446	\$35,370
Future Transit Network		
East/West BRT	58,984	\$6,742
North/South BRT	56,551	\$6,464
Southwest/East BRT	54,896	\$6,275
Middleton BRT	75,336	\$8,611
All-Day non-BRT Service	412,426	\$47,140
Regional Express & Other Peak-Only Service	44,648	\$5,103
All BRT	245,093	\$28,014
Net Additional Service Hours	393,394	\$44,965

Figure 5-j Estimated Annual Service Hours for Recommended Future Regional Transit System

Potential Funding Mechanisms for Transit Expansion (\$1,000s)

Total Expenses and Funding Gap					
Total Expenses by 2050				\$5,668,053	
Projected Funding Gap				\$2,485,766	
Funding Mechanism	Duration/Qty	Per	Increment	Funds	Difference
½ % RTA Funding	15	YR	\$57,236	\$858,547	\$1,627,219
¼ % RTA Funding	15	YR	\$28,618	\$429,273	\$2,056,493
Madison Vehicle Registration Fee (VRF)	28	EA/YR	\$0.008	\$30,936	
Dane County VRF (Potential \$5)	16	EA/YR	\$0.005	\$26,289	
New Service Partner Funding (OP)	16	YR	\$11,336	\$181,381	
VRF and Service Partner Total:				\$238,606	\$2,247,161

Figure 5-k Potential Funding Mechanisms for Transit Expansion (\$1,000s)

steady increases in service, while a ½ percent sales tax would act as a safeguard against future state and federal funding reductions, and allow faster expansion of service. Neither a ¼ nor a ½-percent sales tax would raise the required amount of funding over a 15-year period for full implementation of the planned system. It is important to note that an RTA could be used to fund transit alone or all modes of transportation depending on the statutory language in the enabling legislation. The recommendations above assume all funds are allocated to transit. If funds are divided between modes, additional funding may be required to implement the planned transit system.

BICYCLE PROJECTS

New urban arterial streets and high-volume collector streets are almost universally built with bicycle facilities. Urban arterial street reconstruction projects generally include

bicycle facilities, where feasible, given right of way constraints and competing demands for the space. The cost of these facilities is included in the budget for street projects. Therefore, no additional need for funding is anticipated for on-street bicycle facilities beyond that projected for the roadway system. Major regional off-street facilities, such as shared-use paths, are generally stand-alone projects, although some side paths and grade-separated crossings are now being funded as part of roadway projects. Recent examples include the S. Pleasant View Rd/CTH M (West), McKee Road/CTH PD, and Johnson Street projects.

The RTP identifies a network of planned regional priority paths. See Figure 4-l on page 4-44. Figure A-e in Appendix A lists these projects and the planning level cost estimate for them. There are also some major shared-use path and grade-separated crossing recommendations that have been

identified as part of major state highway corridor studies, most notably the Beltline and Stoughton Road. It is expected that at least some of those projects would be funded as part of those projects.

Bicycle project costs for programmed projects were taken from the current TIP with an inflationary factor applied. Planned project costs were estimated based on planning-level cost assumptions, taking into account the length of the path, character of the corridor, and presence of bridges and underpasses. Planned projects beyond the 5-year TIP were assigned to one of two time periods – 2027 to 2035 and 2036 to 2050. Project costs include



a 1.74% per year inflationary factor. The total cost of these regional priority projects is \$128 million in inflation adjusted dollars. This includes \$27 million in programmed projects in 2022–2026, \$34 million in 2027–2035, and \$67 million in 2036–2050. The total cost of the projects and the cost within the different time periods is well within the funds projected to be available. Total estimated funding is \$342 million, including \$95 million in 2027–2035 and \$202 million in 2036–2050. The additional funding would allow other path projects beyond the regional priority path projects listed to be completed. Thus, path expenses in the two later time periods in Figure 5-g have been set to equal revenues.

Conclusion

The financial capacity analysis for the RTP assumes a 2% annual inflationary increase in federal, state, and local funding. However, the state gasoline tax rate will need to be increased and eventually other new revenue sources (e.g., mileage based registration fee) created in order to offset lost gas tax revenue from electrification of the fleet and inflationary increases in project costs and address long-term system preservation needs. The state gas tax hasn't been increased since 2006 when the automatic indexing of the gas tax and vehicle registration fees to the inflation rate was eliminated. The State Commission on Transportation Finance and Policy's report, *Keep Wisconsin Moving – Smart Investments, Measurable Results*, published back in 2013,

provided recommendations for generating additional revenue, but thus far the state legislature has not addressed the long-term solvency of the state transportation fund. While the IIJA provided historic levels of new federal transportation program funding for the next five years, the bill is being funded with general revenues, which is neither wise nor sustainable.

An increase in funding levels is necessary to maintain and gradually improve the existing condition of the region's roadway system, which based on recent trends has been declining. Increased funding is also needed to fully implement the planned regional transit system, in particular the latter two phases of the BRT system and most of the additional service hours from frequency improvements, new service to developing areas, and commuter express service to suburban communities.

The financial analysis indicates that projected revenues will be sufficient to implement the local arterial roadway capacity expansion projects identified in Figure 4-d in Chapter 4 and listed in Figures A-a and A-b in Appendix A while at the same time funding identified potential arterial street reconstruction needs identified in Figures A-c and A-d in Appendix A and addressing other roadway preservation needs in a manner similar to recent trends. However, this means that local roadway conditions will continue to slowly deteriorate. Major capacity improvements in two state highway corridors (Stoughton Road, Beltline) may or may not be able to be fully

funded based on the funding for currently programmed Major Program projects carried forward into the future. This would depend upon the scope of those projects. It is forecast that \$1 billion would be available for those projects beyond the needs for other state highway construction projects, if currently programmed spending was carried forward into the future.

Significant new transit funding will be needed to implement the recommended regional transit plan, including the latter two phases of BRT, new regional commuter service, and increased local service frequencies. The largest gap is in operating funding. Based on recent trends from 2010–2019 in terms of service hour increases, only about 18% of the recommended service hours in the regional plan could be funded. Implementation of the plan would require a new regional funding mechanism, such as a regional transit authority, with the ability to levy a sales tax. Increases in the current City of Madison vehicle registration fee would not be sufficient.

Estimated future revenues for multi-use path projects based on recent funding levels would be more than sufficient to fund the major regional priority path projects illustrated in Map 4-l in Chapter 4 and listed in Figure A-e in Appendix A. These projects were identified as needed to address key missing links and complete key segments of the planned regional bikeway network illustrated in Map 4-j in Chapter 4. On-street facilities are assumed to be included as part of roadway projects.